JULY 1, 1927

Electrical West

With which is consolidated the Journal of Electricity

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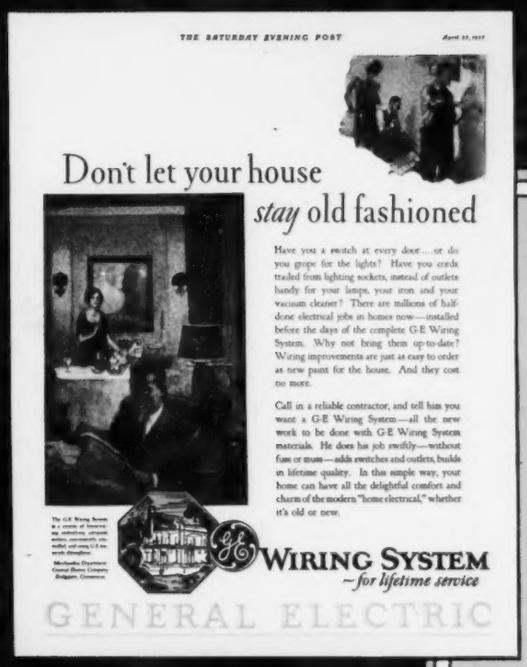
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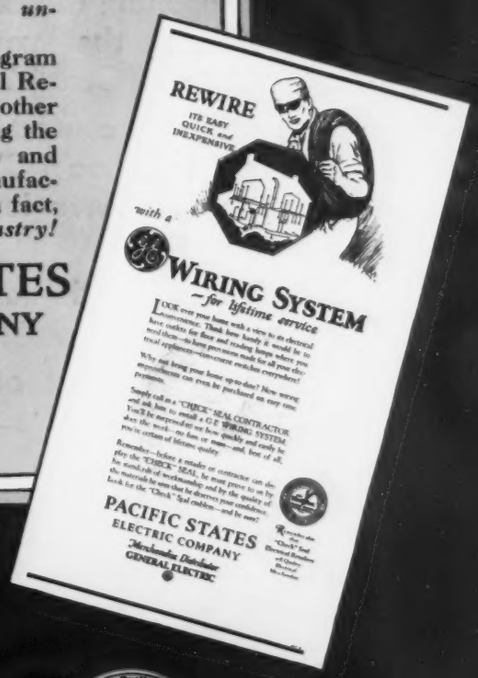

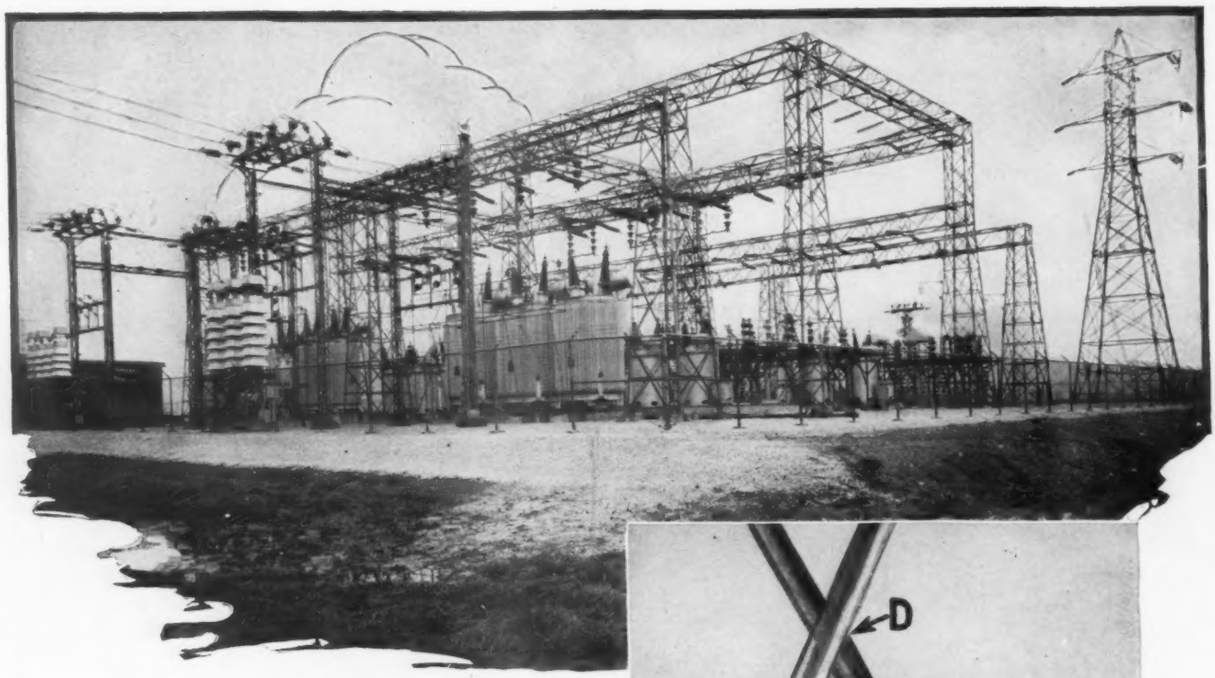

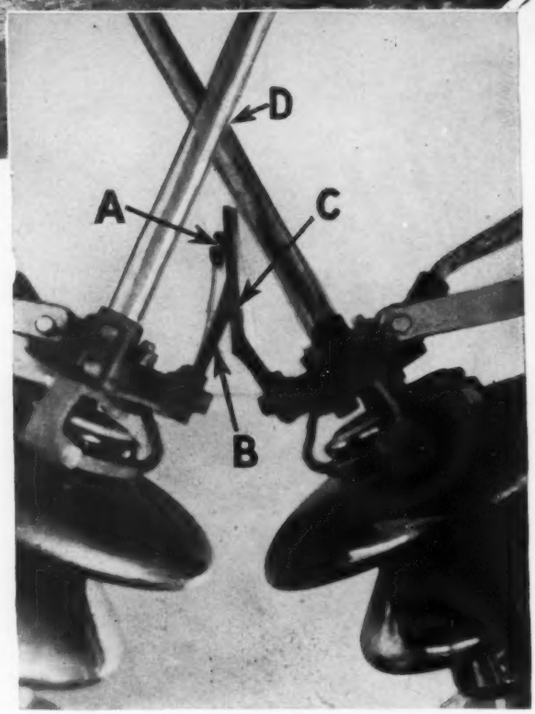

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W. A. CYR, *Associate Editor*
G. R. HENNINGER, *Associate Editor*

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E. K. JONES, *News Editor*
B. H. SNOW, *Northwest Editor*

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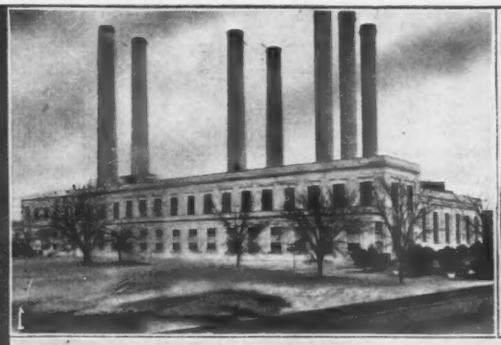
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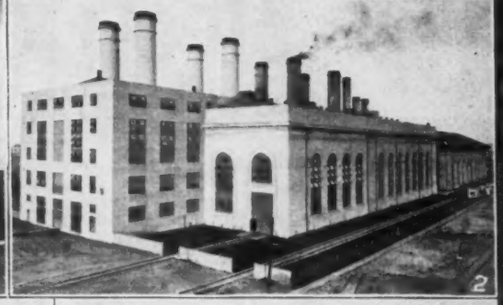
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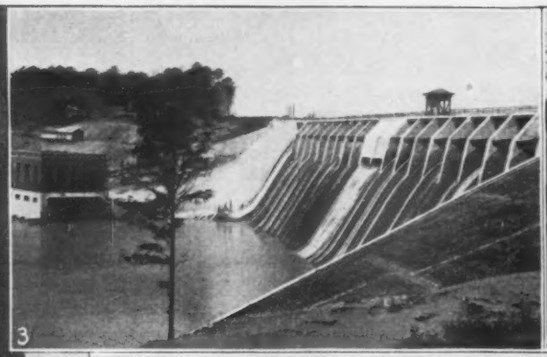
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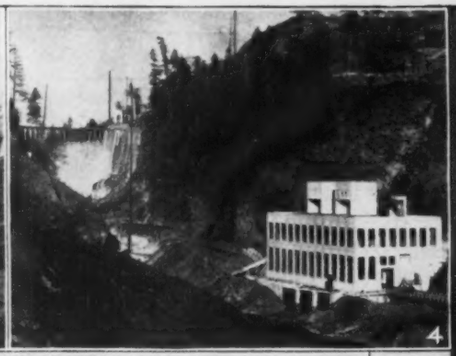
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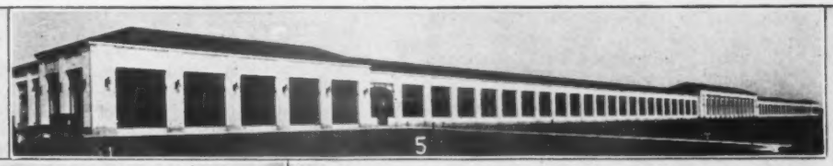
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C. T. HUTCHINSON
Editorial Director

A McGRAW-HILL PUBLICATION

G. C. TENNEY
Managing Editor

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Important Industry Problems Studied at Recent Conventions

CONCENTRATION of attention upon the load-building possibilities of the domestic consumer, a more searching analysis of the factors which make or break public relations, a recognition of the necessities for standard and improved accounting practice, a painstaking inquiry into the more pressing engineering problems —particularly with reference to the relationship between steam and water-power development—and a specific consideration of many of the details which go to make up the sum of electric service, both human and mechanical in their application, occupied the thought of some 800 delegates to the two major electrical conventions of the West held this month.

As a reflection of the good work and the earnest endeavor of the officers and committeemen of both the Pacific Coast Electrical Association and the Northwest Electric Light and Power Association, both the convention at Santa Cruz, June 14-17, and that at Salt Lake City, June 21-24, merit more than passing attention. The proceedings of those conventions will form valuable data for the further development of the industry and set precedents for the work of succeeding administrations.

For those who were not fortunate enough to be able to attend, as well as to serve to refresh the memories of those who did attend and who may have made no notes, an interpretation of those conventions has been prepared by the staff of ELECTRICAL WEST and is to be found in this issue. Covering the varied aspects of the conventions and reporting the more significant utterances of the speakers at each of the sessions, the accounts here may serve to preserve a broad general picture of the conventions and to help derive from such a portrait its most pronounced characteristics. Every reader of this publication, whether or not he attended the conventions, or whether or not be is interested in the particular phase of the industry represented by these associations, will find material of particular reference to his own field in these reports of conventions which searched through every phase of the industry's activity for the solution to its own problems.

Salesmanship Is the Remedy for the Usual Summer Slump

A SHRUG of the shoulders and the remark, "customary summer slump," constitute the manner in which the manufacturer, jobber and dealer pass off the usual slackening in retail trade that occurs at this season of the year. There is no excuse for a summer slump in the electrical business. Electrical appliances furnish the answer to some of the housewife's most disagreeable problems during the hot summer months. With a grill, waffle iron, toaster and percolator, many light meals can be prepared right at the table. The electric range will prove a boon to the housewife who must prepare hot meals in a stifling kitchen over a wood or coal range. The fan always has been a popular item of summer merchandise. Then there is the radio for the vacation.

However, the electric refrigerator should be the major item in any dealer's summer selling campaign. Obviously the time to sell this appliance is during the period when the housewife's mind is on refrigeration. Just the mention of cool drinks, frozen desserts and the other delightful parts of the summer bill-of-fare that the refrigerator makes possible are powerful selling arguments that can be capitalized during the warm summer months.

In so far as the electrical dealer is concerned there should be little opportunity for even thinking of a summer slump. His answer to the seasonal slackening of business should be salesmanship. With the opportunities his line of goods offers, any summer slump that he may suffer can be charged only to indolence.

Co-operation Between Company Departments

NOT long ago a commercial manager of one of the Western power companies recounted confidentially to a representative of ELECTRICAL WEST some of the difficulties he had had with the accounting department of his company in carrying out some of his business-building ideas. Because we know that the case is somewhat typical, and because we feel that by its recounting we may assist in clarifying other similar situations, we pass the story on with comments, and by refraining from revealing the identity of the man or the company we shall hope to avoid being accused of violating the confidence imposed.

This commercial manager had laid his campaign plans for selling a certain small appliance on a very small down payment with small monthly payments. By this inducement of easy terms he though to build load, to sell kilowatt-hours and generally to promote the popularization of electrical appliances on the lines of his company. His plan was vetoed by a high official of the accounting department on the ground that the cost of the bookkeeping would preclude the possibility of making a profit on the sale. It so happened that this particular appliance was in fact a good energy user, and since the commercial manager had been told to develop load and sell kilowatt-hours he was adopting those methods that he knew would be productive. If the cost of handling the account should happen to be slightly more than the net profit made on the sale, the fact still remained that the revenue from the sale of the energy used by the appliance would be practically "velvet," and the popularization of the use of electricity in the home would be fostered, so that the increased

business resulting from the sale would be in excess of what could be estimated with fair accuracy as net profit.

In a second instance, this same commercial manager was campaigning on another appliance and desired to permit his salesmen to sell it not only to those customers on his own company's lines but also to such customers of the competing company as they could. This plan likewise was vetoed from the same source on the ground that the credit risk of selling to a customer who was not receiving an electric bill from the company would be great and that the cost of opening these small merchandising accounts would offset the merchandising profit, as in the former case. "Besides," said the accountant, "why do you want to build up their load?"

Now the commercial manager in this instance knew that people moved around; that in the course of moving they might be induced to switch their service from one company to another; that people like to do business with those firms that treat them well and with which they have had satisfactory relations; that one way to establish relations is to sell a man something he wants at a satisfactory price and generally to evidence an interest in his welfare. The commercial man's idea was that by selling some of the other company's customers he would be establishing a relationship with those people for his own company, and that each relationship so established was a potential prospect some day for service. This, in our opinion, is sound business-building logic.

Now there is no particular moral involved in these cases except that frequently different departments of the same company see the same situation from different points of view. In this instance no one would accuse either department head of conducting his department affairs in any fashion other than that which each thought best served the interests of his company. Nevertheless, there was a clash of opinion, internal disagreement, upset of plans and the consequent inertia resulting from such happenings.

It seems that central stations are beginning to realize that theirs is a commercial business like the corner grocery's; that the company's prosperity demands that business be sought after, not waited for; that methods which have proved successful in other lines of endeavor may be applied to the selling of kilowatt-hours; and, above all, that when the people of a community see the central station out struggling for business just like any other commercial enterprise they realize that the power business is in fact a businessman's business and not a suitable field for governmental operation.

It would seem, therefore, that all departments should strive to reach a common viewpoint in determining what is or is not good for the company. It would seem that all departments should be brought to a common understanding of the importance of the commercial department and into sympathy with its aims and aspirations, and then that the efforts of all should be co-ordinated to secure the maximum fulfillment of those aims.

Portland's Educational Campaign on Refrigeration

IT IS a real pleasure to record the spirit of co-operation evidenced by the refrigeration interests in Portland in their recent ten-day educational campaign, in which the slogan, "Protect Your Food and Health with Refrigeration," was broadcast. No ordinary campaign, this, joined by a few firms selling mechanical refrigeration, but a distinctly major effort participated in by nearly 100 per cent of the refrigeration interests of the city who, recognizing that ice and ice boxes, gas-heated absorption machines and electrically driven mechanical plants all have their economic place in the refrigeration picture, resolved to attempt to put across the idea that refrigeration is a necessary adjunct to proper, modern housekeeping. With all, then, concentrating on this fundamental concept as a basis, and with the eyes of the community forcused on them, and the minds of its citizens opened to more specific conviction, each firm proceeded to put forward its own idea as to how best such refrigeration could be provided, whether by ice or by some of the more modern methods.

Portland's educational campaign on refrigeration was fostered and promoted by the Refrigeration Trades Association of that city, originally formed by the dealers in mechanical plants but later expanded to include dealers handling products having a connection with any sort of regfrigeration. The imposing list of the participants in the campaign, classified as to the nature of their businesses, was summarized as follows: nine furniture houses, two department stores, five mechanical refrigeration agents, nine dairies, two power companies, eleven ice manufacturers and distributors, one gas company, and seven ice box manufacturers' agents. Obviously with this array of backers, including as it did some of Portland's very largest business establishments, editorial co-operation of the newspapers was comparatively simple to obtain. In the hands of a publicity expert, a woman, this phase of the campaign was carried out with admirable effect.

Talks before women's clubs and community clubs were arranged, and domestic science editors of all the papers devoted many columns to the place of refrigeration in the scientific care and preparation of food to safeguard the health of the community. Is it any wonder then that a great impetus was given to the sale of all kinds of devices designed to give refrigeration service, and that the ice box dealer, the ice manufacturer and the mechanical refrigeration dealer had the opportunity of their lives to display their wares under extremely favorable conditions?

The concept that the Portland refrigeration trades have of the situation is simple. It is based on the fact that only a small percentage of the homemakers of the city is sold on the necessity of any sort of refrigeration, and that rather than confine operations to fighting for this small percentage of the possible total business it is better to attempt by education to widen the field of prospects. In this concept is included also an understanding of the fact that people's tastes and incomes vary from year to year; that just as a man goes by carefully graduated steps from Chevrolet to Buick to Cadillac, so likewise can he be educated to go from cold cupboard to ice box to mechanical refrigeration and that in the transition dealers in the whole wide range of refrigerators and refrigeration methods have the opportunity to profit.

What a refreshing and cheerful picture this makes in comparison with the jealous bickerings within the refrigeration trades in some other communities where the mechanical refrigeration fellows revile the iceman, and the iceman fights back in kind, and where the central station, standing as a buffer between the two receives the curses of both! Who shall say that Portland's way of promoting the refrigeration business is not the best way for everybody concerned, the most productive of profits to those in the business, and the most admirable from the standpoint of making refrigeration a factor in the welfare of the community?

Recognition for the Good Works of the Engineer

GEORGE CLINTON WARD, "the rock writer," as the late Charlie Peirson affectionately referred to him, has had the honorary degree of Doctor of Engineering conferred upon him by the University of Southern California.

In thus recognizing the merit of this man the university has done much to bring to the public mind the enormous debt which the nation owes to the engineering and the construction men who are devoting their lives to a constant struggle for the advancement of civilization.

Too often the general public is prone to take for granted the comforts and conveniences which modern civilization makes possible, and in so doing forgets that great group of men, the engineers, who have made this civilization a reality.

It is particularly fitting that this signal award should come to one who, by his ability as an enigneer, has earned the ungrudging admiration of the entire engineering fraternity, and by his unfailing courtesy, modesty, and sincerity has earned for himself the friendship of all who have been privileged to know him.

A New Angle on the Increasing Importance of Fuel-Generated Power

A SHORT decade ago the statement that fuel-generated power some day would supplant water power as the source of basic energy supply here in the West would have been considered heresy. Marked increase in the efficiency of fuel-generating equipment and two almost disastrous water shortages have tended to turn the attention of engineers away from hydroelectric power and to cause them to give serious consideration to fuel-power possibilities. The tremendous production of oil and natural gas also has had a bearing on the supplanting of hydro with steam power.

The increasing importance of fuel as a source of power and the decreasing importance of hydro is emphasized in the recent report of the hydraulic power committee of the National Electric Light Association. This report says:

"With a low price for fuel, proximity to load centers, and absence of very long transmission lines, the steam plant is in a position to offer serious competition to the hydroelectric plant in the delivery of power at low cost.

"Viewed in the light of present economic facts, the probabilities are that many sites will not appear so attractive as in the past to hydroelectric development. This is especially true as the cheapest and most accessible locations have been developed first and therefore future developments will be more expensive. Hydroelectric power certainly has an important place in our industrial development, but the opinion held by the public at large that water power is the cheapest that can be produced must be dispelled."

Should the future trend be away from hydro, there is a possibility that the light and power industry in this section may expect a surcease from political attacks. The romance of "white coal" and "resources of the people in the hands of the power trust" have been some of the strongest talking points of the politicians. If, as the report of the N.E.L.A. says, the public idea of the "cheapness" of hydroelectric power can be dispelled, there is hope for respite from future political interference.

University Training in Utility Management Is Needed

SEVERAL of the leading universities of the country recently have announced the inauguration of courses in public utility management and economics. With the rapid growth of the public-utility industry during the last thirty years have come the opportunity and the need for men familiar with the complex problems of this industry and capable of dealing with the varied legal, engineering, economic and financial phases of management incident to the expansion of utility service and capital investment. The peculiar nature of the service rendered and the relation that exists between the utility industry, its customers and the state, call for a special training whose foundation may be laid in our colleges and universities.

Few of our Western universities offer such courses as will best fit a graduate for future managerial positions in the utility industry. Only in the engineering branches is adequate education available. If proper solicitation and co-operation were to come from the utilities themselves it is highly possible that those in charge of our excellent educational institutions would consider the establishment of courses in utility management and economics.

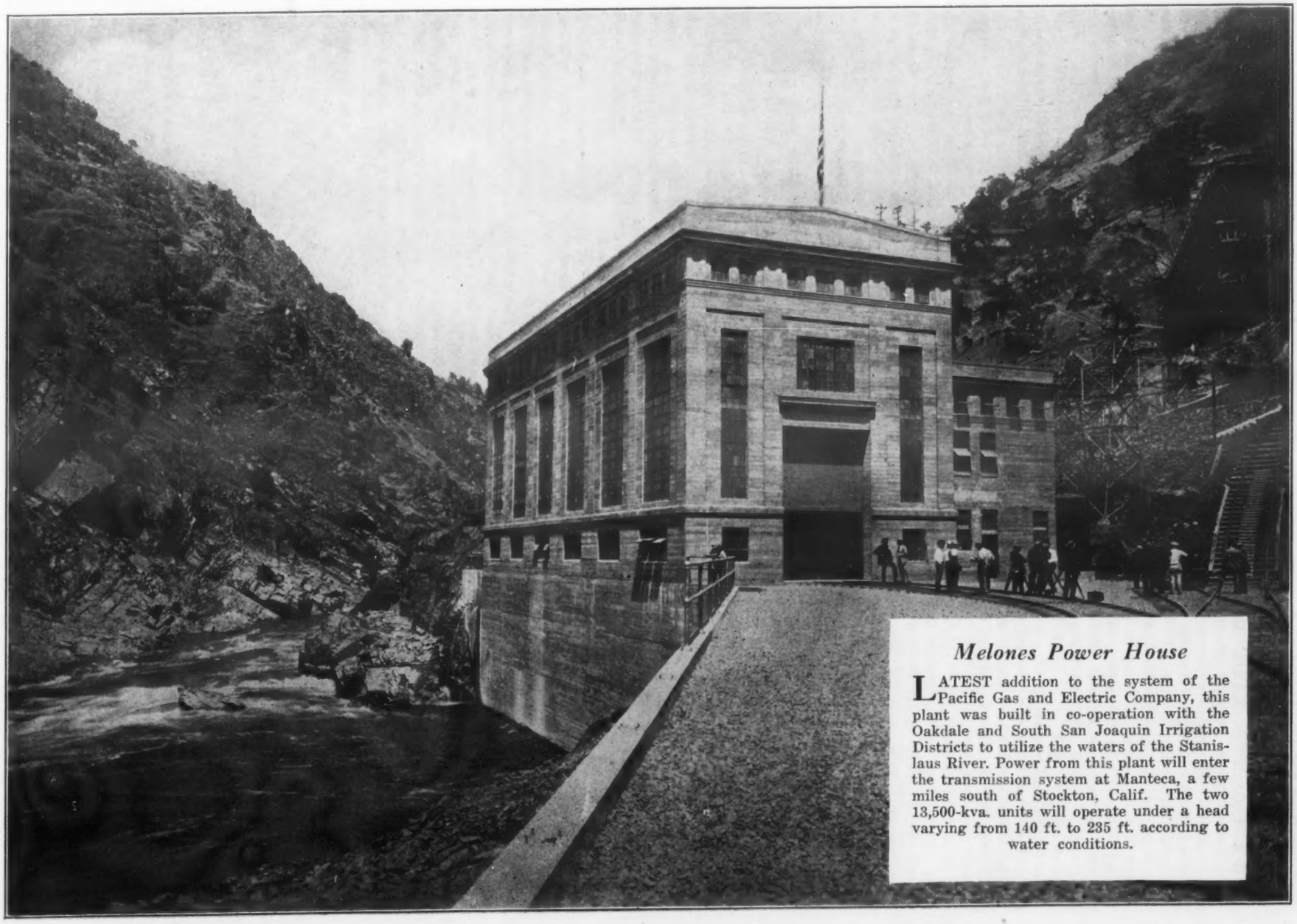
Los Angeles Power Bureau Still Lacks Confidence of Voters

EFFORTS of the Los Angeles Bureau of Power and Light to extend its operations in that southern California city met with a severe setback during the past month. Decisive defeat of two measures sponsored by the bureau indicates that it has not yet earned the confidence of the voters whose support it must have if the ambition of those in charge to create a non-taxable, unregulated and uncontrolled political power monopoly is to be fulfilled.

The returns from the municipal election of June 7 indicate that the voters saw little of merit in either of the two propositions fostered by the power bureau interests. The first sought to authorize the Railroad Commission to proceed with an evaluation of the properties of the Los Angeles Gas & Electric Corporation, the active competitor of the bureau in furnishing power and light to the southern metropolis. The value of this rapidly expanding system with its 136,000 power and light consumers is estimated at approximately $40,000,000. Condemnation and absorption of this property would give the bureau an absolute monopoly.

The second proposition sought to give the bureau permission to acquire land in the Los Angeles harbor district for the erection of a steam plant. This measure was to bring relief from a court injunction prohibiting use of the harbor lands as a site for a steam generating station. It was also in violation of the spirit, if not the letter, of the contract between the Southern California Edison Company and the bureau, by which the utility was to furnish the city with all energy in excess of that generated by the acqueduct plants.

Defeat of those two measures adds another chapter to the colorful history of the seventeen-year career of the bureau. Few will porphesy what the end of that career will be. It would appear that until the frequently made charges of waste, mismanagement, incompetence and political jugglery are lived down or are offset by a competent, non-political and businesslike management the bureau will continue in popular disfavor.



Melones Power House

LATEST addition to the system of the Pacific Gas and Electric Company, this plant was built in co-operation with the Oakdale and South San Joaquin Irrigation Districts to utilize the waters of the Stanislaus River. Power from this plant will enter the transmission system at Manteca, a few miles south of Stockton, Calif. The two 13,500-kva. units will operate under a head varying from 140 ft. to 235 ft. according to water conditions.

Gamut of Industry Problems Run in P.C.E.A. Convention Discussions

IF ANY single factor could be said to have distinguished the convention of the Pacific Coast Electrical Association at Santa Cruz, June 14-17, the establishment of a liaison between administrations and the quick organization of a prepared group of incoming officers ready to resume the work of the association would rank very nearly highest among the many distinguishing characteristics of that meeting. For it must be said that it was an unusual convention in many distinctive features, any one of which could be considered of more far-reaching importance than others.

President S. Waldo Coleman, in his annual report of the president, made mention of this fact. President-elect W. L. Frost gave the utterance substantiation in a meeting of his new executive committee and section chairmen before the convention closed, outlining policies and setting up the work of the new year before the passing administration had laid down the reins, bringing to a close a convention of many original angles, containing more than the usual amount of information, technology and inspiration.

The theme of the convention was "Progress Follows Light and Power." It was expanded and exemplified in practically every address before the convention. Moreover its interpretation was given the meaning that leadership of progress carries with it grave responsibilities. A more frank facing of these responsibilities was made possible to the industry because of a number of searching inquiries into what is expected of the industry by the public. Representing an outside viewpoint, brought to the convention by many of its speakers, this attitude of mind should serve to point the way to weaknesses or misunderstandings of the industry's organization, methods or service, which, corrected or explained, should lead the way for greater progress along lines of light and power and in a manner to engender sounder public relations.

W. L. FROST
Incoming president of the Pacific Coast Electrical Association

Two of the unusual features of the convention were to be found in the luncheons of Tuesday and Wednesday under the dirction of the Advertising-Publicity Section. The first of these, as a final contest of the three-minute speakers, brought into the convention a new and worth-while note. As expressed by Richard E. Smith, chairman of the section, presiding, the speakers represented at that luncheon had earned the right to be there. "They are giving to this convention," he said, "more than they will receive from it." The viewpoint of the employees in respect to company policy on public relations was brought forth by this contest in a way unique to members of the association..

Engineering contributions to the convention programs were marked by two discussions which should be of paramount importance in determining future trends in electrical development in the West. Mr. Markwart's paper dealing with one of the phases of steam development in the state of California, indicates that in spite of the prevalence of hydroelectric power in past development, steam stations located adjacent to load centers are becoming of extreme importance to the maintenance of a proper balance in generation equipment. In spite of recent development of large blocks of steam power, the future conservation of natural resources and a co-operation with the agricultural users of water from California streams will require at least a certain percentage of continued hydro development.

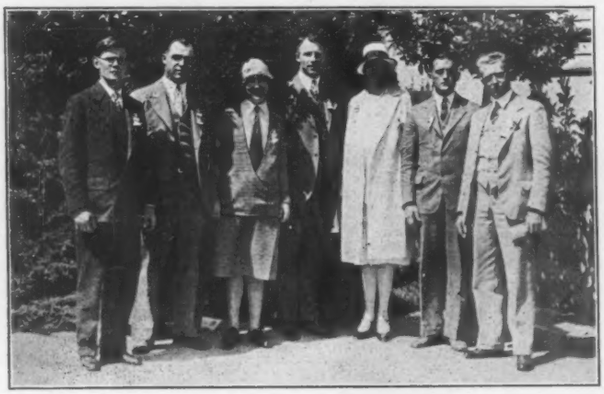
The necessity for the continued use of long-distance, high-tension transmission systems for the transportation of large blocks of power will be necessary. Therefore the Baum principle, as outlined at the convention, will offer an important possible solution to one of the most difficult transmission problems, that of stabilization, and hence will contribute its share to the electric development of the West.

Despite the growth in commercial and sales development in California power companies, the load building possibilities may be said to have scarcely begun. This was brought out forcibly in an illustrated lecture by H. K. Griffin, chairman of the Commercial Section, in which the potential load in each of the various types of electric utilization were pictorially shown. H. H. Courtright in a graphic lecture before the Commercial Section, indicated a successful method of accomplishment through a power-company-dealer co-operative merchandising program.

That the public is essentially fair minded and that it can be interested and aroused sentimentally toward the support of its most cherished possession, the individual freedom to conduct its business in its own way, was the

distinct contribution to the electrical industry given by Dr. Paul S. Cadman of the University of California. His comment that self-restraint will forestall imposed governmental regulation should be taken as the best advice offered during the course of the convention.

From Railroad Commissioner Leon Whitsell came the suggestions that appearances of extravagance, either in equipment or appurtenances, of power companies; that the discrepancies which appear between statements in financial columns and rate applications; that the large expenditures of capital given widespread publicity, be explained more carefully and more satisfactorily to the public in order to offset the criticism which naturally arises from misunderstanding of such affairs.



A group of the three-minute speakers who gave the judges a run for their money. From left to right they are: J. F. P. Thomson, The Southern Sierras Power Company; C. H. Pyles, California Oregon Power Company; Lillian Broeker, San Joaquin Light & Power Corporation; J. L. Farley, Pacific Gas and Electric Company, winner of the contest; Mildred Hinrichs, Coast Valleys Gas & Electric Company; M. A. Seeley, Los Angeles Gas and Electric Corporation; and Charles Hall, San Diego Consolidated Gas & Electric Company. Not appearing in the picture were W. A. Knost, Los Angeles Electric Club, and R. G. Kenyon of the Southern California Edison Company.

Carrying the weight of the influential women's organizations throughout the state, Dr. Mariana Bertola, president of the California Federation of Women's Clubs, in an exposition of the aims and purposes of her organization, opened the gates to a closer co-operation and better understanding between both women's organizations and the electrical industry. Some of her constructive criticisms pointed to conditions which are not completely understood by the women of the state and which will merit the attention of the industry. Her remarks indicated that there should be a more complete dissemination of information regarding not only the electrical labor-saving equipment available but also as to the industry's policies and problems.

W. S. Vivian, chairman of the Public Speaking Committee of the N.E.L.A., brought home a point which has been neglected very largely in the internal relations of Pacific Coast companies. This point was that intensive educational work among the employees of a company is imperative in order that they in turn may inform the public with respect to the company's work.

The following accounts of convention sessions go into more detail in respect to the numerous addresses given and derive from them succinctly the more notable features of each.

Opening Session

Sounding again the convention theme, "Progress Follows Light and Power," the incoming president, W. L. Frost, Southern California Edison Company, responded to the splendid hospitality of the address of welcome given by the Hon. W. O. Kerrick, mayor of the City of Santa Cruz, and officially opened the Eleventh Annual Convention of the Pacific Coast Electrical Association. Subsequently, S. Waldo Coleman, retiring president, presented his report and outlined briefly the particularly significant activities of the various sections during the past year. He strongly urged the strengthening of the policy of continuity of section and association activities. Provision for continuous section activity was adopted three years ago by the Engineering Section through the plan of having the section and committee vice-chairmen accede to the chiarmanship for the following year. Mr. Coleman pointed out the very obvious advantages of this plan wherein each man as he steps into the chairmanship is intimately acquainted with his committee or section activities and thus is ready immediately to launch into the new year's activity without any loss of time and without any appreciable reorganization.

The report of the treasurer, J. F. Pollard of the Coast Valleys Gas and Electric Company, showed that the finances of the P.C.E.A. were in a healthy condition and had been so administered during the past year as to increase the scope of activity of the various sections and to increase the activities possible at the convention. In presenting the report of the office of the secretary of the association Samuel H. Taylor commented upon the state of affairs, financially speaking, and pointed out that as far as value received is concerned each member of the association received a distinctly satisfactory return upon his membership fee. Mr. Taylor also commented upon the increased co-operation between the P.C.E.A. and the N.E.L.A. national committees and the great value accruing both to the association and to the individuals from contact with Eastern men and co-activity with national committees.

Officers for the year 1927-28 as selected by the nominating committee and reported to the Tuesday morning session of the convention were accepted as reported. These officers were as follows:

President: W. L. Frost, general commercial manager, Southern California Edison Company, Los Angeles. First vice-president: P. M. Downing, vice-president in charge of operation, Pacific Gas and Electric Company, San Francisco. Second vice-president: E. B. Criddle, The Southern Sierras Power Company, Riverside. Treasurer: N. R. Sutherland, Pacific Gas and Electric Company, San Francisco. Secretary: Samuel H. Taylor, present incumbent. To the executive committee of the association were named the following: S. Waldo Coleman, Coast Counties Gas & Electric Company, San Francisco; S. E. Gates, General Electric Company, Los Angeles; R. A. Sharon, Great Western Power Company, San Francisco; A. E. Holloway, San Diego Consolidated Gas & Electric Company; San Diego; A. M. Frost, San Joaquin Light & Power Corporation, Fresno; A. F. Morairty, Central Arizona Electric Light & Power Company, Phoenix; D. E. Harris, Pacific States Electric Company, San Francisco; C. T. Hutchinson, McGraw-Hill Company of California, San Francisco; D. E. Heise, Westinghouse Electric & Manufacturing Company, San Francisco; R. E. Fisher, Pacific Gas and Electric Company, San Francisco; A. B. Day, Los Angeles Gas & Electric Corporation, Los Angeles; and R. E. Smith, Southern California Edison Company, Los Angeles.

Three-Minute Speaking Contest

One of the conspicuous features of the convention—and a decided innovation—was the three-minute speaking contest staged at the luncheon on Tuesday under the auspices of the Advertising-Publicity Section and presided over by R. E. Smith, Southern California Edison Company, section chairman.

Those who took part in the contest were John L. Farley, of the electrical sales department, general office, Pacific Gas and Electric Company; J. F. P. Thomson, The Southern Sierras Power Company; C. H. Pyles, The California Oregon Power Company; Lillian Broeker, San Joaquin Light & Power Corporation; Mildred Hinrichs, Coast Valleys Gas & Electric Company; M. A. Seeley, Los Angeles Gas and Electric Corporation; Charles Hall, San Diego Consolidated Gas & Electric Company; W. A. Knost, Illinois Electric Company, who represented the Los Angeles Electric Club; and R. G. Kenyon, Southern California Edison Company. Each of the speakers discussed for three minutes the assigned subject, "What Factor Has the Greatest Influence on

the Public's Attitude Toward the Public Utility?", and all made such excellent speeches that the judges were hard put to decide upon the winner. However, after careful consideration the first prize, which consisted of $100 worth of stock of any member company of the Pacific Coast Electrical Association and an eight-day desk clock, was awarded to John L. Farley, whose speech follows:

The factor which has the greatest influence on the public's attitude toward the public utility is that factor which most intimately touches the public and the factor which most intimately touches the public is associated with personal experience. The more intimate these personal experiences, the more powerfully they influence one's judgment. The service that a public utility gives is the one thing which every consumer experiences most intimately. Excellent reasons may exist for failure to give service. Motives back of acts are only of academic interest and are considered in courts of law, but count for little when the public passes judgment on a public utility. Results count most, and results are measured by service.

Modern, ample, and properly co-ordinated equipment is necessary if a utility is to serve the public; but the best equipped system will fail if properly trained personnel is not available to operate and maintain it. The personnel may have technical training, may be most courteous, and may so administer the affairs of the utility that good profits are available for the owners; but equipment and personnel together will not win the confidence of the public unless there prevails that indispensable factor, *the spirit of service*. Only when all consumers receive that service which results from loyalty, devotion, and acts of heroism above and beyond the requirements of duty, will the public receive that quality of service necessary to its good opinion.

This *spirit of service* is so all-important and so all-pervading that it is well summarized by paraphrasing a part of the Thirteenth Chapter of First Corinthians:

Though I speak with the tact of diplomats and salesmen, and have not *the spirit of service*, I am become as sounding brass or a tinkling cymbal. And though I have the gift of knowledge and understand all electrical mysteries and all sciences, and though I have power plants sufficient to move mountains, and have not *the spirit of service*, I am nothing. And now abideth physical equipment, trained personnel, and *the spirit of service*, these three; but the greatest of these is *the spirit of service*.

One particularly noteworthy feature of this speaking contest was the interest and enthusiasm it created in the rank and file of the industry, and it is to be hoped that this event, so well carried out and so productive of good results, may serve as a precedent for similar activities in future conventions.

Market Development

Clyde L. Chamblin, president, Association of Electragists International, Arthur H. Markwart, vice-president in charge of engineering, Pacific Gas and Electric Company, H. K. Griffin, chairman of the Commercial Section, and a paper by Charles L. Fortesque, Westinghouse Electric & Manufacturing Company, presented by A. W. Copley of that organization, shared honors on the program at the second business session. W. L. Frost, incoming president of the association, also told the members present some of the accomplishments at the Atlantic City convention from which he had just returned.

Mr. Chamblin, speaking on the subject, "Light, Power and Progress," traced the growth of the Electragist organization, at the same time pointing out the good it was accomplishing for the contractor. He described the steps being taken by the Electragists in preparing standards for wiring installations in which consideration is given to safety to life and property, permanency, adequacy, efficiency, and economy of operation with proper regard for cost. These standards are to be placed in the hands of architects, engineers and contractors throughout the country as examples of best practice. In discussing the contractor-dealer as a factor in manufacturers' distribution plans, jobbers' sales and central station load building, Mr. Chamblin said:

"Market development is an industry problem in which every group is vitally concerned. Perhaps no other problem more clearly shows the interdependence of the various groups today and the answer will lie in their ability to meet the problem with consideration and respect for the interests of each other, and, with a united front, to work together in selling the public complete electric service."

Steam vs. Hydro

The changing relation of steam and water power, particularly on this coast where water power has held the center of the stage, was discussed ably by Mr. Markwart. He pointed out that apparently hydroelectric plants have reached their peak in efficiency and that the cost trend is distinctly upward. In addition, the more economical sites have been developed and any further reaching afield will mean more expensive power. In contrast to this, he stated, steam plants have not reached their limit of efficiency or fuel economy and costs are downward.

Notwithstanding these two factors, he showed by the use of elaborate curves that utilization of water power is economically sound under certain conditions of cost and load factor.

Load-Building Possibilities

In reviewing the work of the Commercial Section for the past year, H. K. Griffin used a series of lantern slides to show some of the load-building possibilities that exist in the territory of the association. He pointed out that the trend of the industry's growth curve in the future will depend largely upon the activity of the power company commercial men. He urged that careful consideration be given to all new business possibilities, pointing out that 27 per cent of the kilowatt-hour output of the power plant is sold to lighting customers who furnish 60 per cent of the gross revenue. Domestic lighting, commercial lighting and street and highway lighting were some of the fields he discussed.

Surveys show that the home is less than 15 per cent electrified ,he stated, at the same time urging greater activity in selling to the home appliances of all kinds, including electric ranges, refrigerators, water heaters and air heaters. The rural electrification field, aside from the pumping load, is but slightly developed and the farm home offers a large market for electrical service.

In industry electric heat has a great future and he urged the executives to send members of their sales

A delegation from the Coast Valleys Gas & Electric Company.

organizations to the electric heating schools conducted by the N.E.L.A. each year. New applications for electric heat are developing every day, he stated, while pointing out that wherever accurate temperature control is essential, a better job can be done with electric heat. The isolated plant representing a prospective load of 100,000 kw. in California is a field that must be developed. In conclusion, he pointed out that the successful accomplishment of the task that lies before the com-

mercial departments of the central stations will not only require the co-operation of all branches of the industry but that executives must give to them the same personal and financial support that has been accorded the engineering, accounting and other branches of the industry.

W. L. Frost in recounting the outstanding features of the N.E.L.A. convention sounded the keynote of the coming administrative year when he appealed for a united industry. Quicker solution of the problems of each and every branch will result from closer co-operation among the branches of the industry, he stated.

Transmission Development

The principle of using synchronous condensers at stated intervals along a transmission line for increasing the stability or load limit of the line, which has been patented by Frank G. Baum, prominent consulting engineer of California, was described by A. W. Copley of the Westinghouse company, in the absence of Mr. Fortesque, who was to have presented the subject. A clever mechanical analogy was used by the speaker to show how condensers may be placed along a transmission line at proper intervals to supply the necessary reactive kva. He used the mechanical device to show the vector relations in a transmission line and how, by adding a synchronous condenser, the line, in effect, is divided into units each of which may be operated with as great a phase displacement between sending and receiver voltage as would otherwise be permissible for the whole line. In this manner the power carrying capacity and stability of the line is greatly increased.

Sales Problem Explained

Stating that the sales problem of the power companies is the same today as that which confronted manufacturers five years ago when production overtook distribution, R. W. Turnbull, Pacific Coast sales manager, Edison Electric Appliance Company, addressed the second luncheon sponsored by the Advertising-Publicity

These technical gentlemen of course are E. R. Northmore of the Los Angeles Gas and Electric Corporation (left), A. G. Wishon of the San Joaquin Light & Power Corporation (center) and P. M. Downing of the Pacific Gas and Electric Company.

Section on "Selling Your Job." More sales per man is the goal to which the central stations must work if production is not to be curtailed or revenue reduced, he said.

The same basic principles that apply to the sales of any merchandise must be used by the power company sales manager in selling his job to his executives, to his organization and to his customers. He must create interest, appreciation of value, sense of possession and, finally, value for the price. Interest of the executives can be secured by preparing reports that show results in terms of kilowatt-hours and revenue. The executives, according to Mr. Turnbull, must be made to appreciate the necessity of using electrical appliances in their own homes, as the greatest part of the sales resistance to the further use of electricity in the home comes from within the ranks of the industry itself. Surveys show that the only members of the industry that are enjoying the conveniences of electrical appliances are among the rank-and-file employees.

He stated that a good salesman is a person who can create value in a customer's mind. Executives will appreciate the value of a good sales department when reports show the value of the work the department is doing. Executives must also be made to appreciate the public relations value of a constructive selling plan. In Mr. Turnbull's mind no person eating three electrically cooked means a day will vote against the company that is furnishing the service that makes these meals possible.

Reports that properly picture sales possibilities to the extent that the executive can see these possibilities realized will create a sense of possession that will not let price stand in the way, he said. The cost to the executive for securing the business pictured by the sales manager is greater personal interest and attention to the work of the commercial department and support of that department's plans.

The commercial plan can be sold to the sales manager's own organization, according to Mr. Turnbull, by creating in the minds of its members a sense of responsibility to the company as a personality. Sales programs must be complete and provide a continuity of interest that will keep up enthusiasm. Salesmen must be kept selling, he said, and this can be done by giving them the maximum amount of attention.

In conclusion Mr. Turnbull stated that the central stations cannot be satisfied with "looking" for business but must open up new fields for revenue by merchandising the new services electricity offers.

Importance of Accounting

In introducing Lewis Lilly, accountant, McLaren, Goode & Company, Mr. Coleman referred to the accountant as the pilot in industry. Mr. Lilly addressed the meeting on "Management and the Accounting Department—A Changing Relation." He stated that the doctrine of the "Going Value" theory had been developed by accountants. This theory is being used widely by the public utilities and the various commissions in establishing rates for service. Utilities must depend on their accounting departments in condemnation proceedings; even commission regulation is based on proper accounting methods.

One significant development of the accounting section of the N.E.L.A. is the uniform classification of accounts which has been adopted by a number of state commissions. Mr. Lilly stated that since 1920 accounting problems and methods have changed very rapidly. Budget control has been made possible by proper accounting methods, and the management of business has realized that such a financial guide is essential; this guide has emanated from the accounting department. The budget is a chart or prophecy of future conditions to control various operations; it is a record of opinion concerning future activity based on past experience; it should be used as a guide for management in making decisions. It is only recently that managers have recognized the importance of the accountant and his general ability to occupy high executive positions. Mr. Lilly made the statement that accounting methods have developed faster in other industries than in the public utility business. Some of the qualifications of chief accountant in a public utility as outlined by Mr. Lilly include:

1. Thorough knowledge of accounting practice.
2. Executive ability.
3. Familiarity with all branches of business.
4. Ability to select personnel.
5. Enthusiasm and originality.

The Place of Advertising

W. L. Frost, president-elect, introduced Dr. Paul F. Cadman, associate professor of economics, University of California, who addressed the meeting on "The Place of Advertising in the Electrical Business." Dr. Cadman is a student of business trends as well as a student of human nature and his well established position in the teaching profession gives him the perspective and understanding that enable him to see the large tendencies as they develop in business. He touched upon the inborn sentimentality of the American people showing that even where this human factor is well under control it is a vital factor. It has its bearing upon our acceptance and understanding of business relations. Americanism is the term commonly applied to our sentiment regarding national historical traditions. Underlying this sentiment is our satisfaction in our heritage of freedom and lack of governmental restraint in private and business life. Dr. Cadman stated that through self-restraint we have forestalled governmental restraint and that we must continue to do so.

The electrical industry has been developed by individual initiative under public regulation and occupies a position prominent in the public eye. In view of this it is of particularly vital importance that sound public confidence in the utilities be built up and maintained. One of the surest ways of accomplishing this is to take advantage of public interest and public sentiment by showing and telling the public what it wants to see and to know about the mechanical workings of a power generation and distribution system. The public knows that a touch of a button will send electrical energy into a lamp, a percolator, a toaster, or any of the other home appliances, but that simple operation does not give the consumer even a faint realization of the personnel, plant equipment and engineering problems entering into such service. Dr. Cadman pointed out the success which has been attained by the American Telephone & Telegraph Company in bringing the story of their development to the public through instructional advertising. He emphasized the vast dramatic possibilities of the electric service industry to tell the public the story of power development and distribution. He stated the utility should take the public by the hand and instruct it; that the public is uninformed but by no means dumb. He commended the utilities for their program of public ownership in utility stock, which has done more than anything else to establish confidence and pride in the utilities by a large number of people.

Efforts for Better Lighting

Clark Baker, Sr., of the General Electric Company, addressed the meeting on "Education in the Interest of Better Lighting." Mr. Baker stated that light stimulated our emotions and had appreciable effect upon our food and our clothing. He also spoke of light and its relation to sight. The response to education in light has been less within the industry than without. He spoke of the ready response of the Parent-Teachers Association Congress to education in light as applied to schoolrooms.

In speaking of the educational program of the P.C.E.A. for the coming year he stated that the work of the lighting committee would consist of telling the story of school and home lighting. The Advertising-Publicity Section this year will co-operate with the lighting committee as also will the merchandising committee of the Commercial Section, which will supply ten men to serve with the lighting committee. The work entails telling the story of school and home lighting in 27 cities, with an aggregate population of 2,852,000, before 63 parent-teachers' associations and 36 women's clubs. Mr. Baker stressed the point that pure education in light is essential and that it should not be commercialized in any way.

From left to right we present E. L. Priest of the Pacific Gas and Electric Company, winner of the P.C.E.A. essay contest; J. C. Jordan of the same company; and J. L. Farley, also of the same company, winner of the P.C.E.A. 3-minute speaking contest. Then there is A. C. Joy of the San Joaquin Light & Power Corporation and R. E. Smith of the Southern California Edison Company, discussing the mysterious Prof. Skewby X. Blump.

N.E.L.A. Activities

H. T. Sands, president of the National Electric Light Association, outlined some of the progress which has been made in the N.E.L.A. during its 50 years of existence. He stated that public utilities of today are really public trustees and that their trusteeship is almost as important as their duty to serve. He stated local conditions should govern the work of the organization and that the geographic divisions have been found to be most effective for handling most association work. He stated that the national organization is essential in developing a national solidarity in the public utility business. In pointing out the national aspect of local situations, Mr. Sands referred to the Boulder Dam and Muscle Shoals projects which affect all utility interests. He stated that utilities must work together for one purpose, "Adequate Utility Service—Nation Wide." In contrasting the problem of federal regulation of railroads and the cry for federal regulation of utilities Mr. Sands pointed out the fact that nearly all of the railroad traffic was across state lines while approximately only 5 per cent of the electrical energy passes over state lines. Under present state regulation the utilities, practically speaking, are locally regulated. Under national control most of this would be in Washington. Mr. Sands outlined a few of the outstanding accomplishments of the various national sections:

1. *Accounting Section.*—Development of uniform classifications of accounts.

2. *Engineering Section.*—New developments each year in this section's work. A few years ago 3 lb. of coal per kw-hr. for steam generation would have been considered good while this last year one utility used only 1.09 lb. of coal per kw-hr. Developments of this kind have been made possible largely by the work of the Engineering Section.

3. *Commercial Section.*—This section has tremendous opportunities for service. Refixturing campaigns which are contemplated at the present time offer tremendous opportunities in this section. He also spoke of the possibilities in farm electrification both in the home and in connection with farm work.

4. *Public Relations Section.*—This is the youngest section in the organization, but has accomplished a great deal in breaking down public misunderstanding. In this connection Mr. Sands emphasized the vital necessity of each utility first educating its own employees to a state of whole-hearted interest, understanding and support.

Banquet and Entertainment

It took courage on the part of the convention entertainment chairman, Clark Baker, not to mention a long siege of painstaking preparation, to present at the convention banquet an instructional type of program in lieu of speakers. The 500 people that crowded the ballroom for the banquet were in the customary boisterous mood of the last night of the convention. It was a tribute to the men and women of the industry as well as to the musical director Phil Sapiro, that a very in-

structive and entertaining program was presented inaugurating a new type of banquet technique.

An exposition of some of the fundamentals of light was presented between the first and second courses of the banquet followed between the next courses by a monologue illustrated by a stage setting. The message of the effect of poor lighting and good lighting upon the ordinary furnishings of a home was drematically brought out. G. H. P. Dellman, San Diego Consolidated Gas & Electric Company, presented a prologue and Miss McDonald, Coast Counties Gas & Electric Company, gave an excellent performance in the entertainment program.

Golfing honors went to J. S. Spurk, General Electric Company, Los Angeles, who won the Byllesby Cup by placing low net in class "A". R. E. Bacon, Delano district manager, Southern California Edison Co., took low net in class "C" and carried home the Pelton Cup and the Jobbers' Trophy. Low net in class "B" was won by J. L. Phillips of the Okonite Company, San Francisco. Others who placed "in the money" were: J. O. Tobey, Pacific Gas and Electric Company, Sacramento, low gross in class "A"; H. T. Terry, Pacific Gas and Electric Company, San Francisco, low gross in class "B"; and L. J. Moore, San Joaquin Light & Power Corporation, Fresno, low gross in class "C".

Applied Public Relations as Seen from Different Viewpoints

THE POINT of view of the women of California was brought to the convention through the address of Dr. Mariana Bertola, president and director, California Federation of Women's Clubs, at the Friday morning general session, while the public relations work of the women of the industry was told by Miss Isabell Davie, executive secretary of the Women's Committee, N.E.L.A., and Miss J. Frances Emans, chairman of the P.C.E.A. Women's Committee. The public relations theme of the session was further crystalized by a stirring address on "Applied Public Relations" by W. S. Vivian of the Mid-West Utilities Company.

Dr. Bertola outlined the work undertaken by the California Federation of Women's Clubs in its movement looking to the preservation of California's big redwood trees, in its sponsorship of anti-narcotic legislation, and in its struggle to secure state-wide adoption of the "California Plan of Hospitalization." The latter has as its three cardinal purposes the securing in every county hospital of an adequately equipped children's ward, a properly appointed maternity ward, and a teaching center for young mothers with courses in the care of children. In referring to the survey of the American home conducted by the national federation, she stressed the desirability of completely equipping all homes with electrical appliances, and closed with the suggestion that cheaper electricity might aid in accomplishing this.

Applied Public Relations

Defining public relations as "human relations—a combination of the mental and the emotional, or of what you think and what you feel," Mr. Vivian proceeded to tell how this principle is applied in his own company. The rock foundation of this application, he said, should be a definite program consistently and regularly followed. In this program in the Mid-West company one of the bases is the employee educational meeting, in which employees are trained to have self confidence and are given the opportunity to broaden themselves through public speaking exercises and like activities. Through the media of these meetings employees have been instructed as to the salient facts of the industry and as to company policies so as to be able to take the message by word of mouth out to countless numbers of the public served. He pointed out the superiority of the spoken word over the written word in the telling of the story and urged that a greater effort be made in the Pacific Coast geographic division to enlarge on this phase of public relations activities. Pointing to some of the tangible results of public relations activities within the industry in recent years he named as a major one the present preferred position of utility company securities in the investment market today as against their position ten years ago.

Women's Activities

Reporting on some of the newly undertaken activities of the National Women's Committee, Miss Isabell Davie told of the establishment of the home service division of the national committee, which has issued a pamphlet outlining the plan of organization of a home service department within individual companies. Another new acitvity is the attempt to work out a program of safety for women, to accomplish which the committee has a representative on the National Accident Prevention Committee. Miss Davie further reported that the national committee had sponsored the first short course in electricity in the home at Iowa State College, Ames, to which came 100 entrants from fourteen states. Besides furnishing the usual kind of lectures and skits for use by local committees, the national committee during the past year has been furnishing a series of lectures called "More Power to the Home" in which seven major uses of electricity in the home are explained.

Miss J. Frances Emans, reporting for the P.C.E.A. Women's Committee, announced the expansion of the committee's activities into Arizona and the Hawaiian Islands, where women's committees have been organized for the first time during the past year. She also told of the continuation of the two major phases of the committee work in California, the educational work amongst employees and the work of distributing public information, and reported progress in this program.

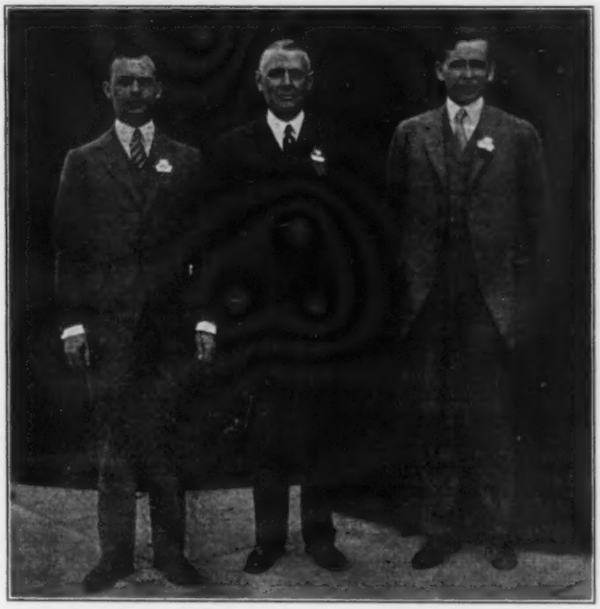
Railroad Commission Suggestions

In point of frankness and constructive criticism the address of Leon O. Whitsell, commissioner of the California Railroad Commission opening the Friday afternoon development conference contributed to the convention not only some first hand information as to the viewpoint of and the problems facing the Railroad Commission, but also by means of anecdote and personal experience gave a reflex of public opinion toward the California utility companies as brought to the attention of the commission.

Mr. Whitsell stated that the Railroad Commission has its own public relations to preserve. He pointed out that appeals to the decisions of the commission and re-

quests for reversals would weaken effective and just regulation and limit the commission's effectiveness. He pointed to the court record of the commission in which out of 18,000 opinions and orders rendered, 128 have been appealed and only 12 have been reversed in the courts of the state.

Of the recent rate reductions in the southern part of the state Mr. Whitsell said, "If the theory that a reduction in lighting rate will result in a greater consumption of electric energy is correct, and I believe it is, this move on the part of the Edison company will mark a new era in the utility history and will contribute materially to the development of the state, and



The three wise men from the East—(left) Paul S. Clapp, managing director; H. T. Sands, president; and Major H. S. Bennion, director of engineering, all of the N.E.L.A.

the comfort and well being of its people. If this proves successful, undoubtedly other utilities will make like reductions."

From personal observation Mr. Whitsell suggested the elimination of a number of sources of possible public criticism. Among these he listed the discrepancies which appear between statements in financial columns and security advertisements on the one hand and in rate applications on the other hand; extravagant looking offices, high-powered automobiles for officials, and other evidences of extravagance; and too much publicity given to large expenditures of capital. He reiterated the statemade by Mr. Ready, former chief engineer of the commission, at last year's convention to the effect that the willingness of power company employees to "pass the buck" to the commission on matters regarding extensions or more adequate service, when it really is either the rules of the company or of public utility act that forbids the desired extension or improvement, is not only unfair and unjust, but reflects no credit upon the employees indulging in it.

Of particular interest in Mr. Whitsell's remarks were his comments to the effect that more inspectors are to be sent out from the commission to check up on rural voltages and especially that the commission intends to maintain practical construction engineers on major projects during construction periods to observe the work as it proceeds and furnish the commission with detailed data and the actual facts and circumstances surrounding each job. This information is to assist the commission in future rate or condemnation proceedings and will guarantee that imprudent and unnecessary expenditures shall not be made which ultimately will reflect in an undue burden on the rate payer.

Farm Problems Discussed

A rather complete analysis of the farm problems in the United States concluding with a plea for a sympathetic attitude and friendly relationship between the electrical fraternity and the farmers was presented to the convention by Earle Houghton, president of the California Farm Bureau Federation. His only objection to regulation as outlined by Commissioner Whitsell was that it did not embrace the farming industry as well as the electrical industry. Mr. Houghton went on to show that the marketing problem for farmers determined the agricultural status of the nation. Three factors which would rectify the present status of agriculture he said would be: (1) commodity control by co-operative effort; (2) balanced production, obtained by the use of organization, economic facts and education; and (3) genuinely sympathetic consideration of the necessities of agriculture by all the groups in our economic structure.

As to the sympathetic attitude Mr. Houghton said that the electrical men should be interested, first, because they serve California farmers some 850,000 hp. of electrical energy and thus are partners in the farming game along with the bankers and others; second, because when farmer turnover is low the farmer feels the burden of the rate; third, because the agricultural power load has been an important factor in leveling off the year-round generation curves; fourth, because prosperous people that can buy power make for further expansion of rural electrical business; and fifth, that the great issue today is whether we shall have a constitutional form of government respecting the rights of private property and reward for individual endeavor, or whether we shall have a communism disregarding individual property rights. "The farmer in America is and always has been the greatest of all property holders and as such a bulwark against communism and kindred movement."

Electricity in Industry

Robert I. Bentley, president of the California Packing Corporation, was the speaker representing the general industrial viewpoint with respect to power progress. Mr. Bentley recited the history of the use of electricity by business and industry, detailing many of the uses of electricity, especially in the canning industries. The speaker stated that electricity is solely responsible for the development of what is called "big business." "Without electricity," he said, "we could not find the employees to conduct bigger business on account of the housing condition and certainly industry would be reduced to smaller units if other forms of power were the only ones available."

National Aspect

A broad survey of the progress of the electrical industry throughout the United States with respect to its position in the world was brought to the convention by Paul S. Clapp, managing director, N.E.L.A. It was Mr. Clapp's first appearance before the P.C.E.A. and his talk was received with particular interest. Mr. Clapp complimented California upon its leadership in electrical development and went on to show the effect of electrical development in nation-wide activity.

Special mention was made by Mr. Clapp of the findings of numerous foreign commissions sent to this country to determine the causes of American prosperity, all of whom had returned reports to the effect that electric

power development in this country was largely responsible for better conditions here. Mr. Clapp explained at some length the advantages of interconnected electrical systems, pointing out that with the advent of electrical energy in industrial operations a great quantity of capital was released to industry which previously had been invested in boiler and engine equipment. During the flood in the Mississippi Valley interconnection had proved especially valuable in the saving of life and property. He said, "An outstanding demonstration of continuity in power supply was shown in the Mississippi flood. Raging torrents flooded out power houses and lightning destroyed others, but interconnection of power lines through Oklahoma, Missouri, Arkansis, Tennessee and Louisiana and the spirit, courage and hours of sleepless effort of this industry's men enabled them to maintain uninterrupted electric service. Horrors of darkness, and loss from factory interruption, were not added to the flood terrors."

During the year just past, the speaker said, electric service was brought into more than 1,250,000 additional American homes. The large use of electricity by the women of this country is distinctively American, he went on to say, pointing out that the women of no foreign country have so many washing machines, irons or other appliances. "The increased productivity in the industry from use of power is a great national accomplishment, but who can visualize what electricity is doing for these millions of American homes? Agnes Sherman, president of the American Federation of Women's Clubs aptly put it, the electrocution of household drudgery."

Transportation Section

"Tendencies of the Future," a discussion presented by P. H. Ducker, superintendent of transportation, Southern California Edison Company, undoubtedly was the most interesting departure from routine business of the Transportation Section. Mr. Ducker dealt with the changing requirements of transportation equipment and indicated certain definite trends which must be considered and provided for. For the discussion of joint problems the Transportation Section met in joint session with the Purchasing and Stores Section for an hour and a half Wednesday afternoon.

Purchasing and Stores Section

The Purchasing and Stores Section held two afternoon sessions, at the first of which were presented a discussion on "Purchasing" by S. Craig Alexander, assistant purchasing agent California Hawaiian Sugar Refining Corporation, and "Storekeeping" by A. S. McKelligon, general storekeeper, Southern Pacific Company. These two speakers presented information regarding modern tendencies in the theory and practice of purchasing and of storekeeping. H. O. McKee, chief traveling storekeeper of the Southern California Edison Company, presented a paper on "Material Control" in which he gave some very definite recommendations regarding the handling of material in the most economical manner. The subject of "Purchasing Policies" was discussed in a paper presented by C. R. Eccles, purchasing agent, Western States Gas & Electric Company, who discussed the qualifications of a purchasing agent, the question of purchasing ethics, the handling of bids and the public relations angle of purchasing activities. Most of the thought and discussion at the sessions of the Purchasing and Stores Section seemed to center around the problems incident to the satisfactory disposition of obsolete material.

Accounting Section

Of the many interesting talks delivered to the convention members, none were more illuminating or instructive than those addressed to the Accounting Section at its meeting on Wednesday afternoon. M. D. Lock, former secretary of the State Board of Equalization, chose for his subject "Taxation" and explained in a masterful way the intricate workings of the California Utilities Tax Laws. Probably there is no one more familiar with this particular subject than Mr. Lock and his talk was not only interesting but of real benefit from an educational standpoint to all of those present.

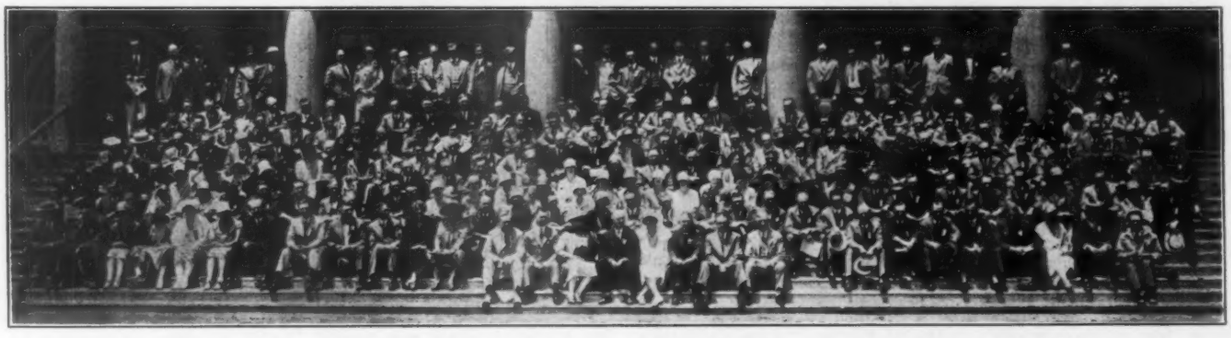
W. C. Fankhauser, in charge of the finance and accounts department of the California Railroad Commission, speaking on the subject, "Accounting for Surplus," enunciated some facts and principles of sound business accounting that were carried away by the attending accountants to be put to practical use in the future.

"Control by Accounts," the subject of the paper read by Prof. H. S. Noble of the Department of Economics, University of California, Southern Branch, is a subject that at the present time is receiving wide attention from business executives and large utility corporations. The speaker emphasized with outstanding clearness the utter futility of even attempting to operate a large business without the assistance of a well devised and carefully managed system of accounts. Professor Noble characterized the accountant as a guide to the executive and guardian of the business.

Advertising-Publicity Section

K. L. Hamman, president of the Johnston-Ayres Advertising Company, addressed the Advertising-Publicity Section's meeting Tuesday afternoon, bringing the advantages of an outsider's viewpoint and an analytical turn of mind. He left with that group a number of ideas worthy of consideration and study in respect to good-will building by means of advertising. Speaking of appliances Mr. Hamman made the significant statement that the devices which will build good-will for a company are not always those which will build the best load. As an example of this he cited the case of the electric refrigerator. He urged that advertisers tell the intimate facts most closely related to the customer in their advertising. The fact that the gas company is going to lay a main next week on a certain street means more to the consumer, he said, than advertising in a general way the company's achievements.

That the use of display advertising for good-will building is extremely difficult and the most dangerous of any form of advertising was a strong point made by Mr. Hamman. Institutional advertising, he said, very often attacks a problem from a wrong point of view and it never should be used unless it is known that it will reflect the customer's point of view rather than that of the company. Bragging about the services of the company will be tolerated no more by the reader than bragging from an individual. A careful study of the features which affect public attitude is necessary and unless an executive is public-minded, advertising of an institutional



This is about half of the delegates and guests attending the eleventh annual P.C.E.A. convention.

nature prepared by him is more dangerous than generally is realized.

"What do your people, the employees of your company, tell their friends about your company?" asked Mr. Hamman, bringing home very forcibly the necessity for the correct attitude of mind on the part of an employee to his company. Such an attitude of mind he said would be a direct reflection upon the management and upon the general conditions in the company. Moreover, closely followed and intensive educational work continuously carried on is needed to keep employees fully informed as to what the company is doing and how it is doing it, so that the employee's natural conversation about the company could not help but be favorable to it. Another point which he made was that a regular audit of the company's good-will should be made and that such an audit is as important as an audit of the financial condition.

The Advertising-Publicity Section made use of the long corridor between the hotel and the casino to put on display a very complete exhibit of the advertising material being used by the various member companies of the association.

Merchandising and Advertising are Themes of Commercial Sessions

THAT central station merchandising can be accomplished successfully through co-operating with existing retail outlets was proved to 150 men in attendance at the first Commercial Section meeting by H. H. Courtright, president and manager of the Valley Electrical Supply Company, merchandising subsidiary of the San Joaquin Light & Power Corporation. By the method of merchandising outlined by Mr. Courtright, not only is the average residential consumption on the San Joaquin system following a definite upward trend but all retail electrical outlets in the company's territory are being kept in synchronism with the strides that are being made by other branches of the industry. He proved that by pointing out the advantages of electrical labor-saving devices through the use of extensive newspaper and direct-mail advertising and frequent demonstrations, the public would be quick to avail itself of this service provided purchase of these appliances was made as easy as possible. A further advantage to the central station from pursuing a merchandising policy of this character accrues from the enthusiastic support of and cordial relations with the various retail outlets.

Co-operative Merchandising

With a quota of 10,800 kw. of heavy duty domestic equipment, including 1,000 ranges, 800 water heaters, 300 heavy duty cooking appliances and 500 large air heaters to be distributed among 12,000 rural consumers during 1926, Mr. Courtright showed that by co-operating with the existing retail outlets, his salesmen were able to achieve an average monthly quota throughout the year of 106 kw. per man, that 70 per cent of the ranges sold went to old residential lighting consumers whose average bill was only $26 per year, and that 80 per cent of the range purchasers also bought water heaters of the 4 or 5-kw. type. Co-operation of the retail outlets was secured by pointing out to them that this quota represented equipment sales possibilities of $220,000 with an additional $150,000 to be spent for wiring. Actual sales for 1926 were $235,000 while the 1927 quota for his company is $259,000.

Lamp socket appliance sales during 1926 to the 55,000 domestic customers scattered over the 10,000 sq. miles of territory served by the company were $960,000. This figure was made possible by the application of department store merchandising methods to stimulate appliance sales. Five campaigns featuring cookers, air heaters, toasters of the turn-over type, waffle irons, and percolators with overheat protection, all heavy-revenue producing, everyday devices, were held throughout the year. Ninety-six retail outlets including contractor-dealers, hardware, furniture and department stores co-operated in these campaigns. Their support was secured by pointing out to them that these special appliances could be used as leaders, that such specials as were sold would net them 30 per cent and that the advertising during the campaign would not only place the power company stamp of approval upon the appliance itself but upon the dealer's store as well. All dealers were urged to sell as many nationally-advertised list price appliances as possible so that all branches of the industry, including the jobber, would share in the results of the campaign. Approximately 14,000 appliances classed as specials were sold during the year representing a gross of $90,000 or less than 10 per cent of the total gross volume of appliance sales throughout the territory.

It is expected that actual sales in 1927 of lamp-socket appliances and heavy duty domestic equipment will exceed $1,500,000 or $30 per domestic consumer in the territory served.

The plan of merchandising enjoys the up-to-date chain store sales possibilities of 96 retail outlets in the San Joaquin territory without any of the overhead expenses of these sales outlets, Mr. Courtright pointed out.

In concluding, Mr. Courtright proved that in comparison to the selling job that other industries such as the bakeries, fruit canners, laundries and ready-made apparel manufacturers have done, the electrical industry has fallen far short in popularizing the services that electrical appliances can perform in shortening the hours of labor in the home. He stated that it is the duty of the electrical industry to give these labor-saving and comfort-giving appliances to the housewife as rapidly as she can economically accept them. He said:

> To do this selling job requires the combined activity of all those interested in our electrical industry working together on a constructive advertising and educational campaign to sell the housewife these labor-saving and comfort-giving appliances that make the home more livable and shorten the hours of labor. This will give the housewife more hours to enjoy those things that help to make life more worthwhile. This can be accomplished, but it must be done in a co-operative way with the power companies' advertising, sales and merchandising departments leading the way.

Essay Contest

Sharing prominence on the program with Mr. Courtright's address was the report of the customer relations committee, presented by W. P. Graef, Southern California Edison Company. Mr. Graef outlined the essay contest carried on during the year, reporting that 1,007 essays on the subject, "How Can I Best Serve My Company and Its Customers?" were submitted in the contest for $750 in prizes offered by the association. The following prize winners were announced:

> First, E. L. Priest, Pacific Gas and Electric Company, $100. Second, F. M. Allen, The Southern Sierras Power Company, $75. Third, DeWitt Scott, San Joaquin Light & Power Corporation, $50. Fourth to eighth, $25—J. R. Gilbert, Western States Gas & Electric Com-

pany; Fred Goelner, The Southern Sierras Power Company; Bertha Briggs, Coast Counties Gas & Electric Company; G. F. Aue, Los Angeles Gas & Electric Company; W. M. Fisher, Los Angeles Gas & Electric Corporation.

Ninth to eighteenth, $15—L. E. Green, Los Angeles Gas & Electric Corporation; Philip Zimmerman, Los Angeles Gas & Electric Corporation; Clarice Cook, Southern California Edison Company; Amy L. Bidwell, Ontario Power Company; W. L. Roberts, Ontario Power Company; William Kickham, Coast Counties Gas & Electric Company; Evelyn Miller, Great Western Power Company; Alex Seidl, Pacific Gas and Electric Company; J. W. A. McIsaac, Southern California Edison Company; R. L. Mathews, The California Oregon Power Company.

Nineteenth to twenty-eighth, $10—Mrs. R. S. Walker, Tucson Gas & Electric Company; Miss G. Teddy, Great Western Power Company; Della Mitchell, Ontario Power Company; W. A. Boone, Western States Gas & Electric Company; Mildred Hinrichs, Coast Valleys Gas & Electric Company; W. G. Partridge, Southern California Edison Company; R. L. Bushey, Great Western Power Company; Dorothy M. Way, Coast Counties Gas & Electric Company; E. T. Erskine, Pacific Gas and Electric Company; Flora Barbieri, Western States Gas & Electric Company.

The Coast Counties Gas & Electric Company with 87 essays submitted from 132 employees led all companies in the proportion of employees competing. The winner of the contest, Mr. Priest, was presented to the meeting by Chairman Graef. His essay follows:

How Can I Best Serve My Company and Its Customers?

By E. L. PRIEST, Oakland Office, Pacific Gas and Electric Company.

When an employee asks himself this question thoughtfully and sincerely he at once increases his potential value both to the company and to its customers. For who can say "My Company" and not feel a deeper concern for the protection of its interests and properties; and who can say "My Company" without striving to promote its integrity and increase its circle of friends? So the employee who truly thinks and acts in terms of "My Company" already has taken a very definite step toward answering the question that he asks.

One of the essentials of utmost service is to get the proper slant on the principle of service. Do not be ashamed to be called a servant—be proud of it. Those who have accomplished the greatest good in the world have been pleased to call themselves servants. Service is the commodity in which our company deals, and its employees who help to dispense that service are assisting to place in the hands of thousands of people the necessities of modern life—light and heat.

The company, as a public servant, is successful to just the extent that its employees emulate the spirit of service in their individual spheres of action. No matter however obscure your position may seem, the intelligent execution of the duties entrusted to you is as necessary to the proper functioning of the company's machinery as are the more prominent ones. It may not be easy to place much importance in the more routine operations, but insofar as customer-relations is concerned, the thousandth time you play your little part is as important and should receive the same painstaking attention as the hundredth time.

Be particular about your personal appearance. There is psychological relationship between neatness and efficiency and between cleanliness and integrity. Courtesy and a clean collar go hand in hand; self-respect invites the respect of others. And whatever your position may be, a genuinely pleasant smile is a wonderful lubricant to prevent the friction that is so prone to rise in the course of public contact. But beware of appearing ridiculous. I well recall the chagrin of a fellow employee who started to joke with a customer over the counter, when the customer coldly announced that he had called on business.

Among the customers with whom the "Public Servant" employee comes in contact are those who, on account of foreign nationality or infirmity, find difficulty in expressing their thoughts. Here is a fine opportunity to make a friend for yourself and your company. Continual customer contact makes it possible to anticipate to a large extent the wants of the average caller. When a person is hesitant in telling his story use this insight in a constructive manner, taking care, however, not to appear to be presuming. This helpful attitude not only creates a feeling of understanding between the customer and employee, but also expedites matters so that the next customer may receive more prompt attention. The office clerk should bear in mind that the customer who comes to the office is entitled to the same attention that the clerk would give as a salesman calling upon the customer for an order.

There are rules laid down by which the employee should govern his work; but it sometimes becomes necessary for the employee to exercise his own judgment beyond the ordinary limits of routine. Not long ago I had occasion to wait upon a party who was very desirous of having gas and electric service turned on immediately. She had telephoned the order earlier in the day, but was harboring a grievance against the company for alleged discourtesy as a result of her phone call. Judging the customer to be sincere in both her complaint and distress, I took the pains to verify the accuracy of the phone call and then, because of the lateness of the hour, issued an order for the "troubleman" to turn on the service. I feel that the friend regained justified the extra effort involved.

This also demonstrates the necessity for consideration when using the telephone. It is not the telephone instrument to which you are speaking, but a real, live person at the other end of the line. Voice inflection is to the telephone conversation what expression is to the face, and I believe that a person is more impressionable when transacting business by telephone than in any other way.

Be extremely careful in making promises. Even if your intentions are of the best there may be a hitch somewhere and, in case of failure to fulfill a promise, the customer not only loses faith in you, but what is more important, he also receives an unfavorable impression of the company, for to him you represent the company. And in this connection I may say that my suggestion for better customer relations is a plea for better departmental relations. Many delays and false promises would be avoided if there was a better understanding between departments. It might be well to hold meetings, perhaps monthly, between two or more departments at which questions concerning the inter-relation of the departments may be taken up. I believe that closer harmony would be gained, which would result in better customer relations.

Do not think that when the day is done you can hang up your company affiliations as you would an office coat. A person's business life is as vitally a part of himself as his social or religious life. Your friends and acquaintances know, and if you wear a service badge you proclaim to the world that you are a Public Service Employee. Make it a symbol of courtesy and an object of respect wherever you are.

Merchandising Studies

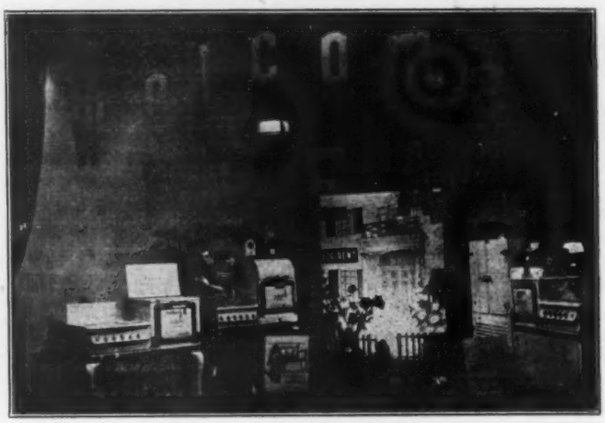
In presenting the report of the domestic range committee, E. F. Perkins, Pacific Gas and Electric Company, stated that while service costs are decreasing and are relatively low, few companies have records that will permit an accurate determination of these costs. He said that in the territory of the association each range requires an average of 1.55 service calls per year at an average cost of $3.79 per year for servicing. The decrease in servicing cost reflects to the credit of the manufacturers, he stated.

The report of the merchandising committee recommended eight plans for increasing the average residential consumption. These were:

1. Support of the Red Seal plan.
2. Encourage the use and sale of radio devices for use from lamp sockets.
3. The sale of kitchen ventilation.
4. The lighting of houses and grounds for protection and beautification.
5. The development of greater refrigeration load.
6. The encouragement of low follow-on types of domestic rates.
7. Greater sales effort on domestic appliances.
8. Collection and distribution of data on consumption in the home.

Influence of Advertising

Inspiring to the commercial men present at the Commercial Section meeting Wednesday afternoon was the joint meeting with the Advertising-Publicity Section at which Al C. Joy, San Joaquin Light & Power Corporation, outlined the necessity of closer co-operation between the two departments as an aid to successful selling. This joint session followed a number of committee reports and preceded talks on gas competition by James F. Pollard, Coast Valleys Gas & Electric Company, and on national commercial activities by W. L. Frost, Southern California Edison Company.



A display window of the Coast Counties Gas & Electric Company attractively arranged.

In tracing the influence of advertising on sales, Mr. Joy explained in turn the two principal types of utility company advertising, the institutional and the load building. To show the relationship between institutional advertising and the commercial department he called attention to the story of rates and regulation as being told through advertising, which is the identical story being told by word of mouth day after day by salesmen and others in contact with the public. Load building advertising is either general or specific, and regardless of which is used, Mr. Joy asserted the advertising should be followed up by personal sales effort. Through-

out the talk was emphasized the necessity of co-ordinating the advertising activities of a company with the work of the commercial department so that the aims of the commercial department might be realized more completely.

Lighting Education

First among the committee reports presented at the opening of the meeting was that of the lighting committee by Clark Baker, Sr., National Lamp Works, who summarized the educational activities of that committee. The lighting demonstration was presented before eighteen luncheon clubs by the committee, and to twenty-one others by representatives of member companies trained by the committee for the work. Twenty jobbers' meetings also heard this talk, which told the story of artificial lighting with the aid of demonstrating equipment. Among other accomplishments of bureau committees, as reported by Mr. Baker, was the manual for highway lighting.

Agricultural Study

Outstanding among the committee reports was that of the newly formed agricultural committee presented by A. M. Frost, San Joaquin Light & Power Corporation, formed to study two projects: the effect of a lowering water table on pumping costs, and the promotion of the use of electricity in the dairy industry. On the first subject seven recommendations were offered. Of these the two most important were: that power salesmen inform themselves on the economic factors governing pumping for irrigation so as to be able to discuss the value of power service in terms of percentage of cost of power to market value of crops; and, that departments for testing farmers' pumping plants be maintained, where practical, to recommend changes in installations to improve efficiencies.

In studying the possible use of electricity in the dairy industry the committee surveyed the field to ascertain its extent and found that California's 600,000 cows yielded in 1926 a product valued at $130,000,000. Reducing the cow to a potential cause for energy consumption through such uses as milking machines, drinking water pumps, barn lights, cream separators, dairy sterilizers, milk refrigerators and feed choppers, it was figured that the market in the dairy industry represented a use of 188 kw-hr. per cow per year or a total of 112,800,000 kw-hr. This total did not include the use for irrigating alfalfa for feed, nor the supplementary use in the dairy farm home.

Commercial Heating and Cooking

Among the accomplishments of the industrial heating committee, as reported by C. J. Cipperly, General Electric Company, were the issuance of a manual for salesmen, and the conduct of a tour for salesmen and executives in the territory of the Southern California Edison Company to existing heating installations to acquaint such salesmen and executives with the possibilities of the field. The preparation of a display and demonstration at the convention was also a part of the committee's work. The principal recommendation of the committee was that heating salesmen and specialists be sent to the industrial heating school of the N.E.L.A. Max H. Lee, Southern California Edison Company, spoke on the characteristics of the load that made it valuable to the central station, and H. H. Fogwell, Everhot Electric Sales Company, Los Angeles, called attention to some of the applications of electric heat possible in small towns.

J. W. Wrenn, Great Western Power Company, reporting for the commercial cooking committee, in illustrating the desirability of the load, listed the loads and kw-hr. use of typical classes of commercial cooking customers, and stated as a conclusion that the average revenue per kw. connected per month is $3. He stated that in estimating the possible consumption of a commercial cooking customer it was safe to figure 60 per cent of the connected load times the hours used. In mentioning specific appliances making desirable additions to restaurant equipment, he called attention to the automatic toaster, of which 1,600 are in use in California, and which yields an average revenue of $8 per month, or $17 per kw-year.

Electric Trucks

Challenging the lack of co-ordinated effort among the central stations in promoting electric truck sales, and the narrow-minded advertising program of storage battery companies, K. I. Dazey, Commercial Truck Company, chairman of the transportation committee, stated that only 66 electric trucks and tractors were reported sold in California in 1926, which represented a falling off of 33 1/3 per cent from the sales of 1925. Summarizing the answers to a questionnaire sent out to member companies, he drew the conclusion that if this condition was to be improved a closer co-operation between and among the individual truck and battery representatives should be established and a more concerted effort on the part of all central stations should be made.

Isolated Plants

The principal work of the competitive power committee was the survey of the isolated plant load in the territory served by the association, reported W. C. Schafer, Pacific Gas and Electric Company, chairman of that committee. The survey showed that there were 125,000 hp. in isolated plants, of which 78 per cent was in steam plants, 14 per cent in diesel engines, 5 per cent natural gas and 3 per cent miscellaneous. Of the steam load, 85 per cent was found in the oil refining industry, the lumber industry, the sugar industry and in municipal pumping. Forty-six per cent of the diesel load was in agriculture, and 14 per cent in the ice industry. The total isolated plant load represents a dead investment, including the investment in central station standby service, of $4,000,000, which could largely be done away with if advantage were taken of the diversity offered through the use of central station energy alone. It was recommended that the incoming committee continue the studies begun, to discover what chance there might be of securing some of this business for the central station companies.

Section Plans for 1927-28

Putting into operation the reorganization plan adopted during the year, the Commercial Section executive committee held an organization meeting before the close of the convention that augurs well for the coming year. Work of the section for the coming year has been outlined, committee chairmen have been announced and plans made for holding the first conclave in Los Angeles some time in September.

W. C. McWhinney, Southern California Edison Company, section chairman, and J. F. Pollard, Coast Valleys Gas & Electric Company, vice-chairman, announced the following section organization: J. H. Jamison, Westinghouse Electric & Manufacturing Company, Los Angeles, secretary; executive committee, Clark Baker, Sr., National Lamp Works, Oakland; George Bigelow, Southern Sierras Power Company, Riverside; E. F. Perkins, Pacific Gas and Electric Company, San Francisco; J. W. Wrenn, Great Western Power Company, San Francisco; W. P. Graef, Southern California Edison Company, Long

Beach; R. L. Cardiff, Coast Counties Gas & Electric Company, Santa Cruz; A. M. Frost, San Joaquin Light & Power Corporation, Fresno; G. H. P. Dellman, San Diego Consolidated Gas & Electric Company; C. J. Geisbush, California Electragists; A. H. Nicoll, Graybar Electric Company, San Francisco; G. C. Tenney, ELECTRICAL WEST, San Francisco; Glenn D. Smith, Ontario Power Company, Ontario; H. K. Griffin, Western States Gas & Electric Company, Stockton.

The general committee, including the customer relations committee, will be under the chairmanship of W. P. Graef with W. C. Schafer, Pacific Gas and Electric Company, vice-chairman. G. H. P. Dellman, San Diego Consolidated Gas & Electric Company, will head the lighting committee, with R. S. Prussia of the Westinghouse Lamp Company as vice-chairman. A. M. Frost will head the power and heating committee, with P. P. Pine, San Diego Consolidated Gas & Electric Company, as vice-chairman. E. F. Perkins will be chairman of the merchandising committee with H. C. Rice, Southern California Edison Company, vice-chairman. Complete committee personnel will be announced later.

Engineering Developments Set Pace for Electrical Industry

IN ACCORDANCE with established practice the Engineering Section devoted a major portion of the time of its two sessions to addresses from outside speakers on subjects of general interest and devoted only a minimum amount of time to the presentation and discussion of detailed committee reports. Each chairman touched only briefly upon the more important features of the year's work of his committee, referring for detailed study to the May 15, 1927, convention extra issue of Electrical West, in which were printed reports covering practically all of the activities of the several committees for the past year. Each committee chairman had the opportunity of selecting and presenting to the session a speaker on some subject or activity pertinent to the committee's interests and work. Seven of the committees took advantage of this opportunity resulting in some very able speakers injecting into the session the broadening influence of points of view from outside the utility organizations.

Accident Prevention

Accident prevention education and resulting benefits are neither as widespread nor as effective as they should be in P.C.E.A. territory, according to M. S. Slaughter of the Southern Sierras Power Company, retiring chairman of that committee. In making his report Mr. Slaughter pointed out in particular two fundamental weaknesses in accident prevention organization and activity as nominally practiced by the average company. The first of these difficulties is the fact that there has been entirely too much divergence of opinion between construction and operating men as to proper accident prevention procedure. The second difficulty rests in the fact that too many so-called accident prevention committees are made up too much of men in contact with and studying only the theoretical side of accident prevention work and having insufficient contact with practical work.

As a remedy for these conditions Mr. Slaughter recommended an active accident prevention committee or organization made up of both construction and operating men and functioning under the direction of a well trained and thoroughly competent safety engineer. As a further aid in the reduction of accidents the accident prevention committee of the P.C.E.A. definitely recommends the adoption by all operating companies of a definite safety code.

F. B. Lewis Presents Paper

A discussion entitled "Accident Prevention" prepared by F. B. Lewis, assistant general manager, Southern California Edison Company, was presented by S. C. Haver, Jr., manager of personnel for that company. Mr. Lewis in his paper considered the subject of accident prevention from the point of view of an operating executive. He considers definite and standardized statistics to be a vital necessity in the intelligent study of accident conditions and the effective application of preventative methods. In discussing the figures compiled by the National Safety Council wherein it is shown that on the Pacific Coast during 1925 the accidental deaths were 2.55 times greater than the average national figure, the hours of lost time per 100 employees due to injuries were 1.54 times greater on the Pacific Coast than for the national average and the days lost time per 100 employees per year due to accidents were 1.78 times greater on the Pacific Coast than for the national average, Mr. Lewis stated that quite obviously there is adequate room for vast improvement in accident conditions among member companies of the P.C.E.A.

Mr. Lewis outlined the plan of the Southern California Edison Company wherein the responsibility for safe performance of work and accident prevention in general is placed squarely upon foremen, superintendents, and such men. The Edison company considers that it is just as much a part of the foreman's job to see that a job is done safely as it is to see that the job is done on time and within cost estimates. The foreman must see that proper safety appliances and tools are provided and are in good condition just as much as he must see that his gang is provided with the necessary construction tools. To co-ordinate such work there is a central accident prevention committee having a branch committee in all large plants, substations and construction camps.

In general the accident prevention activities of the Southern California Edison Company, according to Mr. Lewis, have given quite satisfactory results in all departments and have proved that the expense necessary in the promotion of satisfactory accident prevention and safety activities is comparatively inconsequential, but does result in a vast saving both to the men and to the company.

Electrical Apparatus

The six outstanding studies conducted by the electrical apparatus committee, as reported by H. A. Laidlaw of the Pacific Gas and Electric Company, retiring chairman of that committee, were: relays and relay applications, oil circuit breaker design and operation data, transformers and regulators, station design practice, operating methods and routine, and fire protection and prevention. According to the chairman notable advances during the year include the development and application of the a.c. network relay, the improvement of devices for changing transformer taps while transformers are under load, and the perfection of air-jet cooling for transformer banks. As a matter of economy the electrical apparatus committee seriously recommends the use of self-cooled instead of water-cooled transformers in all cases except where some particular condition may make imperative the use of water-cooled equipment. The cost of water and the cost of maintenance of water-cooled apparatus, such as the cleaning of coils, etc., is the basis upon which the committee's recommendation is made.

Another recommendation made by the committee, this time to the manufacturer, is for the further simplification of oil circuit breakers. Some simplification already has been effected and this together with the use of high quality material in certain important parts has resulted beneficially. However, the present cost of oil circuit breakers is entirely out of proportion with other equipment and therefore the committee feels that research should be encouraged to find some other means of circuit interruption.

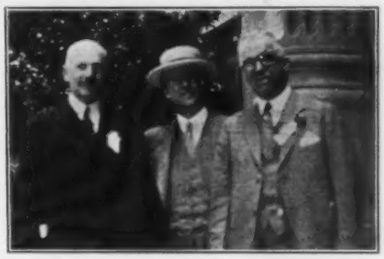
Louis F. Leurey Speaks on Engineering

"The Business of Engineering" was the subject of an address by Louis F. Leurey, consulting engineer of San Francisco, who was presented by Mr. Laidlaw on behalf of the electrical apparatus committee. Mr. Leurey characterized engineering as a business and not a science, further stating that engineering is a practical application of scientific knowledge to obtain a definite objective in an economic manner. Thus, if an individual is to be characterized as a successful engineer he must thoroughly understand himself, accurately judge his capacities and limitations and must have definite direction of personal effort.

Mr. Leurey outlined some of the many different responsibilities and problems involving the activities of engineers and others in the electric utility industries, stressing the necessity of capitalizing upon every opportunity for broader contact and a fuller understanding, not only of different angles of utility business but of civic problems as well.

Hydraulic Power

Activities of the hydraulic power committee, according to retiring chairman J. M. Gaylord, of the Southern California Edison Company, have included a group of studies selected because of their particularly important bearing upon efficiencies in construction and operation of hydroelectric power systems. Some of the more outstanding efforts of this committee for the past year include (1) a study covering the subject of "Efficient Handling of Stored Water," (2) evaporation studies undertaken in an effort to find and justify simpler and cheaper methods of forecasting and determining water losses, (3)



'And an engineer shall lead them." Only here it seems that L. F. Leurey, consulting electrical engineer of San Francisco, might be pushing J. W. Wrenn of the Great Western Power Company (left) and M. C. Hixson of the Edison Lamp Works of the General Electric Company, destination unknown.

a continuous year-to-year study of the mechanical reliability of hydro machinery being carried on throughout the entire country and which ultimately will result in a thorough understanding of the common causes of troubles in such machinery and thus assist in their prevention. A good many other important studies are under way including a study of silt deposits, a study of pressure tunnels, a study of water-hammer tests and studies of different types of dams.

Pfau Explains Hydraulic Turbines

As the speaker sponsored by the hydraulic power committee, Arnold Pfau, consulting engineer of the Allis-Chalmers Manufacturing Company, Milwaukee, presented a very enlightening discussion on "Characteristic Features of Present-Day Hydraulic Turbine Designs." Mr. Pfau illustrated briefly the history of the development of water wheels pointing out that the water-wheel is man's earliest form of mechanical power device, water-wheels of a crude sort being in operation as early as 14 B.C. The mechanical and physical characteristics of the three major types of water-wheels of the present day were outlined and the logical application of each discussed to some extent. The three classes touched upon were: (1) the impulse or action-type wheel, (2) the so-called Francis or reaction-type turbine, and (3) the propeller-type wheel which Mr. Pfau terms as suction-jet turbine. While the speaker discussed each of the three types, he enlarged to a certain extent upon hydraulic theory and gave his hearers a much clearer understanding of hydraulic machinery and its operation.

Inductive Co-Ordination

The inductive co-ordination committee originally was interested only in the limited field of telephone and telegraph lines but now has branched into the field of radio telephony, carrier-current telephony, supervisory control, railway signal systems and automatic train control systems, according to the report of L. J. Corbett, Pacific Gas and Electric Company, retiring chairman. The committee has taken an active part in studies relative to use of common primary and secondary grounds on light and power systems and has made headway with the Pacific Radio Trade Association in the relief of radio interference. The chairman pointed out that the scope of activity of the committee is widening rather than narrowing and that much important work lies ahead.

Major Bennion Tells of N.E.L.A.

Under the auspices of the inductive co-ordination committee, Major H. F. Bennion, director of engineering, N.E.L.A. headquarters, gave rather a detailed outline of the many different projects being carried on under the direction of the N.E.L.A. headquarters engineering staff and through the co-operation of the various committees of the engineering section. Major Bennion pointed out that it is the desired function of the headquarters engineering staff to assist in carrying out investigational work at the request of and under the direction of the Engineering Section. With such a permanent staff it is possible to carry on practical research work to a much greater and more far-reaching extent than would be possible if such work had to depend entirely upon any one committee or a group of committees of the Engineering Section. It is not the desire of Major Bennion that his division shall instigate the activities, but rather that his division shall supply the man-power necessary to carry on research work as may be needed.

Two items of particular interest are the experimental work being carried on at the University of Michigan to determine all of the different stresses in pole-line structures in an effort to develop what might be termed a "Fundamental Theory of Overhead Construction," and the efforts of the Harvard Bureau of Research in studying the problems, political and otherwise, incident to interstate power interchange. Only about 5 per cent of the power developed flows across state boundaries.

Meter Committee

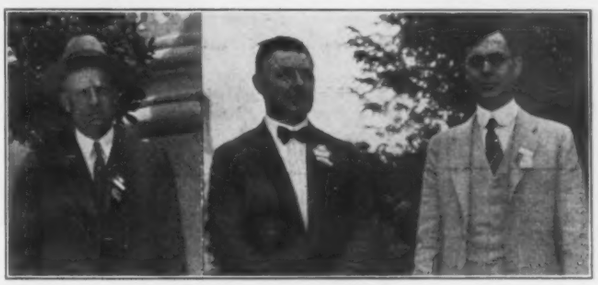
Various studies and investigations carried on by the meter committee have resulted in increased efficiency in personnel and equipment in this very important phase of electric utility activity, according to A. J. Hall, Ontario Power Company, retiring chairman of the committee.

Overhead Systems

Satisfactory gages and specifications for the standardization of pin and insulator threads and thread gages, further experiences with the use of hot-line tool equipment, a tabulation of construction and operating information on 220-kv. transmission lines, studies of joint-pole and overhead construction practice, and further investigations in the field of treated and untreated poles are some of the many interesting subjects reported upon by C. E. Young, Pacific Gas and Electric Company, retiring chairman of the overhead systems committee.

Insulator Manufacture Described

As his speaker, Mr. Young introduced S. L. Case of the Westinghouse Electric & Manufacturing Company, who gave a lengthy discussion of the "Development of Porcelain Insulators." Mr. Case described qualities and characteristics of raw materials, manufacturing processes and other features incident to the manufacture of insulators. Methods and results of both service and laboratory tests upon various different styles and designs of insulators were outlined by the speaker who spoke assuredly and optimistically regarding continued improvement in insulator quality to meet the increasingly severe service demands now placed upon such units.



E. D. Searing (left) consulting engineer for the Portland Electric Power Company dropped in to see how the California bunch does it, and J. G. Rollow (right) of the Los Angeles Gas and Electric Corporation, retiring chairman of the Engineering Section, P.C.E.A., had a program full of information for him. The gentleman in the center is C. F. Gilcrest of the San Joaquin Light & Power Corporation, incoming chairman of the Engineering Section, P.C.E.A.

Prime Movers

Increased operating efficiency and the gathering of operation data of various kinds that will assist in the more intelligent, economic and efficient operation of existing steam plants has occupied a major portion of the time of the prime movers committee, according to the chairman, C. W. Wiggins of the San Diego Consolidated Gas & Electric Company. As a result of the committee's activity during the past year some very important studies have been made and detailed reports covering them have been published in the May 15 convention extra issue of Electrical West.

Inasmuch as the work for which the safety rules committee was organized has been completed, E. J. Crawford, San Joaquin Light & Power Corporation, retiring chairman of that committee, announced that the committee has been discontinued and that certain threads of this committee's work will be picked up by other existing committees. As a fitting close to the committee's activities, Mr. Crawford presented G. E. Kimball, electrical engineer of the California Industrial Accident Commission, who presented a paper "Electrical Inspection and the Inspector." Mr. Kimball outlined the many difficulties facing the commission and others interested in the safe handling and utilization of electricity. The general theme of Mr. Kimball's paper dealt with the necessity and great desirability of a uniform electric code that would apply to all cities and communities alike and avoid the difficulties and expenses of the many different standards now in vogue.

Increasing growth in Western metropolitan areas and a desire for improved appearances in residential districts is focusing an increasing amount of attention upon the subject of underground transmission and distribution of electric energy upon the Pacific Coast, according to N. B. Hinson, Southern California Edison Company, retiring chairman. Mr. Hinson outlined the results of his observations on Eastern trips and described the activities of his committee which were reported upon in full in the May 15, 1927, covention extra of Electrical West. To acquaint Pacific Coast engineers and others attending the engineering sessions at the convention with some of the problems incident to the manufacture and distribution of underground cables, Mr. Hinson presented Dr. Robert J. Wiseman, research engineer of the Okonite Company of Passaic, N. J., who spoke upon "Cable Manufacture as an Engineering Problem."

Dr. Wiseman Describes Cable Problems

Dr. Wiseman followed briefly through the history of development of underground cable, pointing out the various influencing factors in the evolution. Aside from the technical description of materials and manufacturing processes Dr. Wiseman pointed out two particularly salient facts worthy of the attention of those using and specifying underground cables. The first of these facts is that during the earlier stages of development of underground cable, when cable manufacturers were comparatively poorly equipped with manufacturing and testing facilities, the very active assistance of power company engineers had a marked and beneficial influence upon the development of cables. During this early period the experiences and studies of power company engineers led them to make increasingly rigid specifications and lead them more and more into detail regarding both raw materials and manufacturing processes based upon operating experiences.

The second salient fact brought out forcibly by Dr. Wiseman was that a continuation on the part of power company engineers and others interested from that viewpoint to specify so rigidly and so much in detail the various materials, processes and tests through which a cable must go to be satisfactory to the users will result only in hampering the further development of underground cables and thus will result decidedly to the detriment of the users of underground cable.

Commercial Development Stressed at Northwest Convention

MARKED emphasis was placed on commercial development at the twentieth annual convention of the Northwest Electric Light and Power Association which, with the adoption of a formal resolution decrying the agitation to put the government into the power business, came to a close June 24 at Salt Lake City after four days of interesting and instructive business sessions and a variety of delightful entertainment.

Among the topics heard were: "Shall We Put the Government Into the Power Business?" "Commercial Development of the Electrical Industry;" "Lighting the Way to More Kilowatt-Hour Sales," and "Electric Power and the Nation's Prosperity".

Registration totaled 444, the largest in the history of the association, and the percentage of attendance at the sessions, which were held only in the mornings, was exceptionally high. D. C. Green, vice-president and general manager of the Utah Power & Light Company, and president of the association, presided.

Officers elected for the coming year were: president—A. C. McMicken, general sales manager, Portland Electric Power Company, Portland; vice-president-at-large—R. M. Boykin, manager central district, Puget Sound Power & Light Company, Seattle; members of executive committee—J. I. Colwell, manager, Graybar Electric Company, Seattle, and J. P. Lottridge, vice-president and general manager, Eastern Oregon Light & Power Company, Baker, Ore. State vice-presidents selected were: Oregon—Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany; Washington—Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane; Idaho—R. B. King, general superintendent, Idaho Power Company, Boise; Montana—W. B. McDonald, Mountain States Power Company, Kalispell; Utah—P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake.

P. M. Parry headed the general convention committee, while the entertainment committee, under the chairmanship of J. A. Kahn, president of the Capital Electric Company, Salt Lake, provided a variety of entertainment much appreciated by the delegates.

Facts of Electrical Industry Must Be Broadcast

That proposed federal regulation of the electric light and power companies is but a political blind designed to hamper the industry in the discharge of its obligations to such an extent that government ownership will appear to be the logical remedy, was the warning sounded by both D. C. Green, president of the Northwest Electric Light & Power Association, and H. T. Sands, president of the N.E.L.A., at the first general session of the convention Tuesday, June 21. Other speakers were Lafayette Hanchett, president, Utah Power & Light Company, Salt Lake; A. C. McMicken, president-elect of the association, and E. O. Howard, Salt Lake banker and president of the Utah Light & Traction Company.

Annual convention pickling process under way at Saltair Beach.

President Green in the annual president's address contended that the public utility business is the best-managed business in the country today, and that its remarkable growth in the short space of 40 years is largely the cause of whatever misunderstanding exists today in the minds of the public. He called attention to the fact, however, that the total amount paid by the public for domestic service is far less than amounts paid for many commodities in the luxury class. This statement was made in an endeavor to show that the power business is not the gigantic and predatory monopoly that many believe it to be. He urged that such comparisons be brought out in the publicity work carried on by member companies.

Drawing a comparison between political owenrship and the kind of ownership that now exists he stated that one in every 7½ customers on the lines of the Utah Power & Light Company is a preferred stockholder and that dividends paid

on these holdings amounted to $11.05 annually for every residential customer. In addition, the Utah company pays an average of $13.25 per customer in annual taxes which would be lost to the taxpayers if the company's system were governmentally owned. The sum of these two amounts is about equal to the average consumer's annual domestic lighting bill on the company's system. President Green urged that member companies spread their messages through the medium of well-informed employees, contending that a few facts broadcast over the back fence are more effective than the same facts told over the footlights by a paid orator.

Stating that investments of 3,000,000 individuals, plus extensive investments of life insurance companies and savings banks in the securities of the light and power companies, created a trusteeship for the electrical industry, H. T. Sands, president of the National Electric Light Association, exhorted the geographic division of the N.E.L.A. to discharge their local obligations properly so as to make adequate electric service nation-wide. The solidarity of the industry must not be lost sight of, he stated, pointing out that major problems such as have appeared at Muscle Shoals, the St. Lawrence River, Boulder Dam, and the Columbia Basin are of just as much importance to the industry in Maine as in California.

Summarizing the work of the four branches of the industry, he pointed out that the Accounting Section had secured the uniform classification in most states; that the engineers had reduced the average quantity of coal per kw-hr. from 3 lb. a few years ago to 1.96 lb. today; that commercial men were awakening to the vast opportunities ahead of them, particularly in residential load-building and in rural electrification; and that public relations work required unceasing effort to bring about an understanding by the public of the simple problems of the business. Touching the general problem of bringing to agriculture the great benefit of electric service, now being attacked so vigorously through the studies of 21 state committees, he said, "If we can make farm use profitable to the farmer and the electrical industry alike, and if we can better the living conditions of the farm home, then we shall have made one of the greatest contributions in our history to the commercial, economic and social welfare of the country."

A. C. McMICKEN
New president of the Northwest Electric Light and Power Association

In his address of welcome, Lafayette Hanchett, president, Utah Power & Light Company, sketched the history of power development in Utah, in which much pioneer engineering was done, 44-kv. transmission having been among the early experiments. In connection with his outline of this development he happily recalled the memory of L. L. Nunn, of the Telluride Power Company, giving credit for much of the achievement to the courage and foresight of this well-remembered pioneer of electric service in the West. A. C. McMicken, responding to the welcome for the association, stated that the year had been one of accompishment, and pledged the association to continued effort.

E. O. Howard, president of Walker Brokers' Bank and of the Utah Light & Traction Company, Salt Lake, having been invited by the chairman to address the convention, stated that the electric light and power business was fascinating and that its development is one of the outstanding romances of American industry. Reminding the delegates that the vast investment in the electrical business included holdings by a large number of widows, orphans and dependents he pointed out that it was the responsibility and the opportunity of the industry to protect the safety of those investments.

C. W. Lundquist, secretary of the association, reported a healthy condition as to membership in that this membership had increased from 315 in 1924 to 531 in 1927.

Lighting, advertising, refrigeration, selling and practically every other phase of commercial development featured the second session of the convention, June 22, which was under the direction of G. C. Sawyer, chairman of the Commercial Section. In addition Miss Isabell Davie, secretary of the N.E.L.A. Women's Committee, reported upon some of the newly undertaken activities of the women of the industry. Included among the speakers were J. E. Davidson, former president of the N.E.L.A., and former chairman of the Commercial National Section; Clark Baker, lighting specialist of the National Lamp Works, Oakland, Calif.; Joseph Carmichael, director, Iowa Committee on Public Utility Information; G. S. Jones, Jr., public utility division, Frigidaire Corporation, Dayton, Ohio; R. W. Turnbull, Pacific Coast sales manager, Edison Electric Appliance Company.

In outlining the work of the Commercial Section of the Northwest association during the past year Mr. Sawyer called attention specifically to the increasing importance of diesel-engine competition, to the lighting schools that were conducted in the Northwest during the past year, and to the possibilities of residential lighting. He described the new reorganization plan of the section which will prevent duplication of effort and will provide continuity in the work of the section. In the future the section will have a vice-chairman who will succeed the chairman in office. Complete plans for the year's activity will be outlined by the section executive committee at each convention so that there will be no lost motion in the work of the committees.

Miss Davie called attention to the successful short course held at Iowa State College and urged public utility executives to work with the home economics departments of colleges and universities in the Northwest to establish courses in the use of electrical equipment in the home. She declared that such educational activity could not help but stimulate merchandise sales. Marked possibilities await any utility that ties in with the "Better Home Equipment" campaign that has been undertaken by the Federation of Women's Clubs, she stated, citing as proof the experiences of electric service companies in Texas and other states.

Fundamentals of good lighting practice were explained to a large group of contractor-dealers and jobbers' salesmen in Oregon and Washington as the result of lighting schools held under the direction of the lighting committee of the section, A. C. McMicken, chairman. In the opinion of Clark Baker, who conducted the schools, the 190 men enrolled in the three schools held in Portland, Spokane and Seattle, were well repaid for their time. He demonstrated vividly by means of slides and models the method used in the course of instruction.

During the coming year education in lighting will be taken outside the industry, Mr. Baker stated. He told of the plan of the committee to present the illustrated lecture on light before luncheon clubs in practically every city in the Northwest. Every club in all of the large cities in the Northwest division will be covered by a capable speaker during the coming year. These lectures have been eminently successful in California cities.

That good newspaper advertising is the groundwork for all other phases of utility publicity was the opinion advanced by Mr. Carmichael. He reported that advertising by utilities in Iowa has increased a thousand per cent during the past few years and that, as a result, the power companies enjoy the most friendly relations with both press and public. He declared that good advertising was a form of insurance to which every utility should give attention. He decried the utility that was too modest to advertise, following the theory that actions speak louder than words. "This is the practice of the burglar," he said. "Many legitimate businesses have suffered because they felt that advertising could bring no benefits to them."

Development in refrigeration has reached the point where manufacturers can offer to the public any type or size machine demanded, according to G. S. Jones, Jr., in his address

on the "National Aspect of Refrigeration." Today's problem is strictly one of selling, and three possible plans are open to the central station," he stated. All companies should sell the refrigeration idea from the standpoint of better health and sanitation, whether they merchandise the units or not. They then can follow one of three plans: they can co-operate to the fullest extent with all dealers; they can sell units themselves; or they can place their facilities at the disposal of some one unit manufacturer.

He cautioned any company entering the direct-selling field to organize completely, since many failures have resulted because full cognizance had not been given to the complexities of merchandising electric refrigeration service. In conclusion he declared that 10 per cent of the domestic customers of the power companies are expected to purchase units within the next three years. This market represents 1,750,000 units or an annual revenue to the central stations of $70,000,000, which is more than the street railways of the nation paid for power used in 1926.

A sales force is as good as its sales executive—that was the message of Ray W. Turnbull to the commercial men at the convention. Following the same line of thought as in his address before the P.C.E.A. at Santa Cruz., Calif., Mr. Turnbull urged the commercial men to give their sales force a definite plan of sales procedure, including sales talks suited to every type of appliance prospect. The best selling organization can be built from the personnel of the power company itself, he declared. In conclusion he stated that demonstration is one of the most powerful and most frequently overlooked factors in successful merchandising of electric appliances.

That there has been a general awakening in the commercial departments to the fact that the electrical industry is further from saturation than any other industry in America was the message J. E. Davidson brought from the N.E.L.A. convention. He urged the following of the program of the "three R's" adopted by the national section, namely, ranges, refrigeration and re-lighting. In these domestic fields lie the greatest possibilities for the sale of kilowatt-hours and, in his opinion, much of the success of the industry during the coming year will depend upon how diligently commercial men apply themselves to the solution of this problem.

Trade relations have not received proper attention in many districts, Mr. Davidson stated, pointing out that electric service companies have not co-operated with dealers in the past to the extent that this branch of the industry merited. He declared that the dealers are attempting to do the very thing that the commercial departments themselves are trying to do—sell more kilowatt-hours. In consequence they deserve the fullest measure of co-operation and support.

Mr. Davidson concluded with the suggestion that the entire industry put on a national newspaper and magazine advertising campaign similar to those of the thirty or more co-operative associations now engaged in such advertising. He cited the success of many of these campaigns and pointed to the sales possibilities, both from the standpoint of appliances and kilowatt-hours, that the industry might expect from such an undertaking.

Engineers and Accountants Outline Their Problems

Tendencies in large transmission and distribution systems, cable manufacture and methods of accounting for depreciation were the subjects discussed at the third general session, June 23, which was divided between the Engineering and Accounting Sections. C. S. Dakan, professor of business administration, University of Washington, Seattle, brought an outside viewpoint on the debatable subject of how depreciation should be handled in accounting practice. Tendencies toward steam generation in California were discussed by H. A. Barre, executive engineer of the Southern California Edison Company, while Dr. R. J. Wiseman, research engineer of The Okonite-Callender Cable Company, Passaic, N. J., told of some of the developments in the manufacture of high-voltage cables. Paul S. Clapp, managing director, N.E.L.A., delivered an address on "Electric Power and the Nation's Prosperity."

Voicing a plea that cable purchasers should not attempt to write too elaborate specifications into their cable orders, Dr. R. J. Wiseman told of the extensive research carried on by cable manufacturers in an attempt to develop equipment that would meet the changing needs of the industry. Some of the tests required by purchasers, he said, have been useless and have added to production costs. He urged that the manufacturers could better spend this additional cost in research work to find the most satisfactory material for insulation and the most satisfactory construction design. Sketching a brief history of the development in cable manufacture, he showed slides illustrating present-day manufacture and tests and research. He stated that development in the future would be toward designing for higher voltages and for greater load-carrying capacities, and confidently assured his hearers that manufacturers would be well able to meet the requirements.

(Left to right) A. C. McMicken of the Portland Electric Power Company, newly elected president of the N.W.E.L.& P.A.; D. C. Green, of the Utah Power & Light Company, retiring president; O. L. LeFever, of the Northwestern Electric Company, chairman Engineering Section; H. A. Barre of the Southern California Edison Company; Major H. S. Bennion, N.E.L.A., director of engineering.

Cycles of low water in streams originally determined the size of steam plants, but now systems are being balanced economically as between steam and hydro and consideration must be given to many other influences according to H. A. Barre who told of the tendencies toward large steam-plant development in southern California. Increasing construction costs of hydroelectric developments and decrease in operating costs of fuel plants due to increasing efficiencies and larger units were the principal influences leading to these steam-plant developments.

Depletion of oil resources or an abnormal increase in the cost of this fuel, he said, would cause the industry to turn to coal. In this event the Utah coal fields would become a factor. Low-temperature, high-pressure carbonization with attendant recovery of by-products will decrease power production costs in the future, he predicted. Stating that further increases in fuel efficiency might be expected, he mentioned the experimental installation of a Benson boiler in Berlin, which may produce even greater economies than now exist.

W. L. Fitzpatrick, chairman of the Accounting Section, presided over the second part of the session, and told of the successful mid-season meeting of his section in Portland at which forty or more committeemen met to hear papers and discuss problems.

Stating that American industry has found remarkable expression in the development of the privately owned light and power business, P. S. Clapp stated that the economies of operation effected through interconnection and other means had been passed on to the benefit of the industrial growth of the nation. These benefits have been reflectd particularly in the economic condition of the working man, who now produces more goods with less effort, enjoys more leisure, and earns a wider margin over his cost of living than ever before.

Interconnection, he said, has been of great advantage to industry generally in that it facilitates better factory location, permits capital otherwise tied up in factory power plants to be released for other development purposes in industrial

Delegates to the twentieth annual convention of the Northwest Electric Light and

enterprises which yield a larger return, and enhances the security of power supply to industry. As evidences of the great advantage of this security of power supply, he cited the almost uninterrupted service rendered to the stricken Mississippi flood areas, and the preparation of the Georgia and Tennessee power companies to "bucket-brigade" large blocks of power into the Carolinas during the currently expected water shortage in those states.

Making an appeal for a unification in utility companies' methods of handling depreciation, C. S. Dakan, University of Washington, urged that the wide distribution of utility investments made desirable such standardization. Recognizing the wide disagreement on the subject of how depreciation

W. H. Onken, Jr., editor of Electrical World; P. M. Parry, Utah Power & Light Company, vice-president for Utah; B. E. Rowley, Edison Electric Appliance Company, chairman golf committee; J. E. Davidson, ex-president of the N.W.E.L.& P.A. and N.E.L.A., vice-president and general manager of the Nebraska Power Company.

should be accounted for, he discussed the practical application of the three main theories regarding it and called attention to the fact that standardization would assist investors in understanding financial statements and in making them check with observation of the physical properties.

Touching upon the subject of valuation for rate bases, he contended that increasing construction costs had placed an over-estimate on the importance of using replacement cost less depreciation in arriving at the proper valuation. Stating that the peak in construction costs had passed, Professor Dakan urged that the industry use historical cost as the basis, in which case the element of depreciation need not figure.

"Shall We Put the Government Into the Power Business?"

W. H. Onken, Jr., editor of Electrical World, New York, forcefully presented the subject "Shall We Put the Government Into the Power Business?" at the fourth general session, June 24. This session was devoted to public relations activities and women's committee work. Other speakers were R. M. Boykin, chairman, Public Relations Section; Miss Marguerite Butler, chairman, Northwest Women's Committee; and Mrs. E. O. Moyle, chairman, Utah Power & Light Company's Women's Committee. In addition the meeting was entertained by an educational skit put on by members of the Utah Women's Committee.

Calling attention to the constructive and protective nature of the Federal Water Power Act, W. H. Onken stated that movements on foot to obtain special legislation for certain sites should be resolutely resisted since such action would constitute a partial repeal of the water power act and would result eventually in its distintegration. He said, "It (the act) is enabling, not disabling, legislation imbued with the sanctity of reason and it recognizes the economic place which water power development must occupy in the scheme of national aggrandisement."

Referring to the Swing-Johnson Bill, which proposes to control the floods of the Colorado River by the Boulder Dam and the incidental sale of power from the project, he stated that flood control must not be made the subterfuge for the government to engage in the power business. He pointed out that a flood control dam and a power dam are two distinct things, since a flood control dam means an empty dam in which to store flood waters, while a power dam means a full reservoir to secure head for the water wheels.

In reporting on the activities of the Public Relations Section, R. M. Boykin gave unstinted praise to the Women's Committee, saying that this committee had done much to raise the morale of the company organizations and to spread the story amongst customers. Although no committee had in hand the direction of public speaking activities, he reported that during the year 1,064 talks had been made in the territory reaching 126,000 people.

Reporting for the chairman of the committee on co-operation with regulatory bodies, who was unable to be present, G. I. Drennan, Pacific Power & Light Company, Walla Walla, told of the new work started by that committee in laying the foundation for the establishment of courses in public utility economics in various universities in the territory.

Reports by the state vice-presidents on legislation proposed, passed or defeated in the several states, revealed that no matters of particular concern had arisen in Idaho, Montana and Utah. In Washington, however, among other bills proposed in the recent legislature, a bill permitting cities having municipally owned power plants to sell current outside their corporate limits had failed of passage. In Oregon, the Housewives' Bill proposing the state's entry into the power business had failed by four to one, and an effort to bring up the subject again in the recent legislative session was likewise defeated.

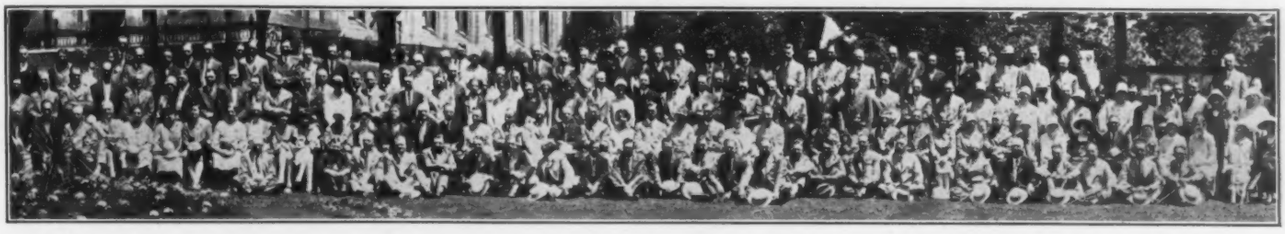
Miss Marguerite Butler, Portland Electric Power Company, Portland, reported for the Women's Committee that at the end of the association year there were thirteen local committees functioning. She stated that employee meetings conducted by local committees had followed the program outlined by the National Women's Committee, stressing particularly house wiring, home lighting and the use of household appliances. The work of one of the local committees was explained by Mrs. E. O. Moyle, Utah Power & Light Company, who told of the development of interest among the girls of her company in this activity.

In the administration session immediately following the public relations program, officers were elected as previously listed, and an important amendment to the constitution was passed providing for an additional vice-president-at-large who

W. P. McDonald, Mountain States Power Company, Kalispell, Mont. (left), Montana vice-president for four years, then, G. C. Sawyer, Pacific Power & Light Company, chairman Commercial Section; J. A. Kahn, Capital Electric Company, chairman entertainment committee.

should succeed to the presidency the following year. This was in accord with a desire to effect a continuity of action in association activities and to gain time in organization after each annual convention.

Entertainment features included a trip to Bingham to see the famous Utah Copper Company's mine, the president's' reception, a luncheon for the ladies at the country club, a trip to Saltair Beach, a tea for the ladies at the home of Mrs. D. C. Green, wife of the president of the association, a dinner dance at the Hotel Utah, an organ recital in the Mormon Tabernacle, a dinner dance at the country club, and the annual golf tournament. In the latter event, P. M. Parry, Salt Lake, won the Kilowatt Cup, while E. G. Hall, General Electric Company, Portland, captured the Manning-Bowman Trophy.



Power Association, photographed on the Mormon Temple grounds, Salt Lake City.

Engineering Practice

Distribution Substation for Residential District

Investment Efficiency and Community Good Will are Direct Results of Good-Looking "Residence" Type Substations

By C. C. Long, Department of Engineering Design, Southern California Edison Company, Los Angeles

WHEN the residential section of a large city spreads out over a great area there are many cases where the industrial districts that may be used for substation sites are too far from the center of load to give good distribution economy. The obvious solution is to design the substation so that it may be built near the center of the load, making whatever changes are necessary in the conventional type to overcome the objection of the householders among whom the installation is to be placed. In the substation here described, the equipment is concealed in a structure closely resembling a small house. By making this small house of pleasing design in keeping with its surroundings the residents are pleased and welcome Mr. Power Company as a good neighbor.

Fig. 1. One of the Southern California Edison Company's distribution substations.

This type of substation receives power at 11 or 15 kv., 3 phase, 50 cycles from either one or two overhead or underground lines, and distributes overhead or underground at 4 kv., 4 wire for lighting, power and street lighting. In any case all circuits enter and leave the substation grounds through underground lead-covered, paper-insulated cables. This company's practice has been to place all equipment out-of-doors whenever practical. This outdoor construction gives greater safety from fires and explosions, reduces equipment and construction costs to a minimum, and does not present difficult maintenance problems.

High-voltage equipment and transformers are installed in a court behind the building and surrounded with walls which to outward appearances are the walls of a flat-roofed portion of the cottage, even to the doors, windows and down-spouts. No part of the equipment inside is higher than the top of the wall; thus the observer outside does not suspect the absence of the roof.

For architectural reasons the top of the wall could not be more than 11 ft. high. The high-tension equipment is designed so that exposed bare parts are not less than the legal height above ground and yet no part of the structure is higher than the 11 ft. specified. This limitation accounts for the somewhat congested appearance of that part of the installation. For like reasons the 4-kv. room was limited to a 10-ft. ceiling.

The building follows the long, low lines of California-Spanish architecture. Walls are of metal lath, plastered inside and out, supported on wooden frame work. All lumber is treated to resist fire. Heavy studding is used to form the thick walls so necessary to this type of construction. The roof is of mission tile and the front porch is laid with heavy red title. The exterior is finished with white stucco troweled to resemble old adobe walls.

Heavy doors and wrought iron hardware with wrought iron grilles at doors and windows carry out the Spanish note consistently. The walls around the court are of the same type of construction except that some steel uprights were necessary to strengthen them. The court is paved with concrete to keep down the dust. A carefully planned landscaping around the property with plenty of shrubs and flowers gives the necessary contrast to the plain lines of the building.

Neighbors close to a substation have objected many times to noise from the appartus. In these stations the regulators are chosen particularly for their quiet operation and transformers with an exaggerated hum also are rejected

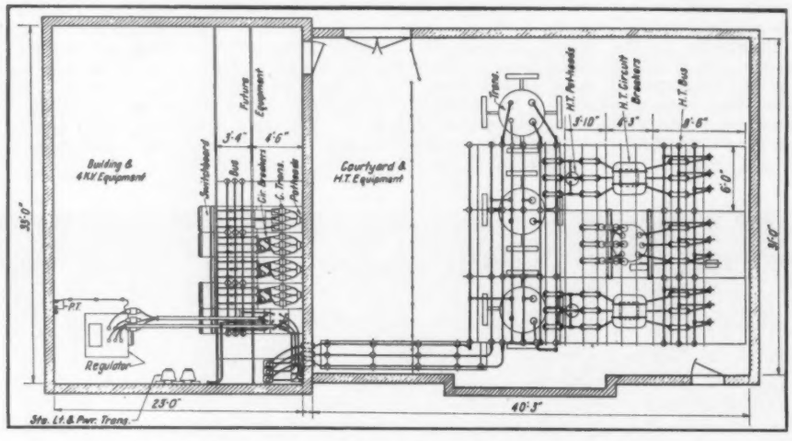


Fig. 2. Plan view of equipment, residence type substation.

for these installations. The double plastered walls have deadened the noise effectively so that even the resident on the adjacent lot cannot object to the substation on that score.

High-tension equipment in the court is laid out with a single-bus arrangement for two lines and one bank of transformers. Three single-phase self-cooled transformers connected delta-star are used in the 11/4-kv. bank. The maximum installation contemplated is three 1,000-kva. units. The bus, disconnecting switches and circuit breakers are mounted on a 2-in. galvanized iron-pipe framework with safety screens between circuits. A circuit breaker of 5,000 amp. rupturing capacity may be installed on each line and for the transformers. These are manually closed and may be automatically opened if desired. In the installation shown in accompanying illustrations the circuit breakers on the lines are of less interrupting capacity because they are not opened automatically being used only to switch out lines.

The transformer breaker is of the larger capacity and is controlled by induction-type overload relays. A gang-operated air-break switch by-passes the tranformer breaker so that it may be removed from service for maintenance work without interrupting service. In order to remove the tank of this breaker a concrete pit is provided in which to lower it. High-voltage lines are brought in by 3-conductor lead-covered, paper-insulated cables to 3-phase potheads. There are no meters on the high-tension side of the station.

Arrangement of the 4-kv. equipment in the building is very flexible. A pipe framework on one side carries the 4-kv. flat bus, the automatic reclosing switches, the disconnecting switches and the switchboard panels. Voltage regulators are lined up opposite the switches with an aisle between. Without a great many changes the arrangement can be changed from one regulator, regulating the bus as shown in the illustration, to two buses with one regulator each, or to one regulator per circuit.

As this station is designed to be operated without an attendant, automatic reclosing mechanisms are installed on all outgoing 4-kv. feeders. These mechanisms are of the centrifugal, a.c. motor-operated-type with timing and lockout relays. Each set of relays is wired to control from one to three circuit-breaker mechanisms. A special arrangement is used for the street lighting circuit whereby different phases of the primary are opened and closed automatically, on an all-night and a midnight schedule by time clocks with automatic reclosing in case of trouble on any one. Power for station lighting and for operating regulators and switches is taken from a small bank of transformers connected through fused disconnecting switches to the main 4-kv. bus.

It is necessary to have definite-time-limit relays on the high-tension transformer switch to prevent tripping off the entire station on heavy low-tension feeder faults. A 32-volt storage battery with some form of trickle charger is used generally to trip these high-tension breakers. An a.c. source of potential for tripping was tried out on one installation but did not work satisfactorily.

The induction regulator used on the job shown is a 3-phase unit, 10 per cent buck or boost, with the auxiliary equipment mounted on a panel on the regualtor. A knife-switch arrangement is used to take the regulator out of service. For the present the entire station is regulated by one regulator. As the load develops the feeders may be grouped on two sections of the bus with a regulator to each section. Should the class of service warrant, a regulator may be installed for each circuit, in which case a transfer bus with double pole switch on each circuit for cutting out the regulator and the feeder circuit breaker will be installed. All 4-kv. disconnect and cutout switches are mounted on marble bases without locks.

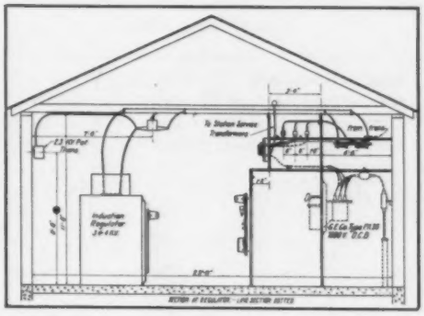


Fig. 4. Section through 4-kv. room.

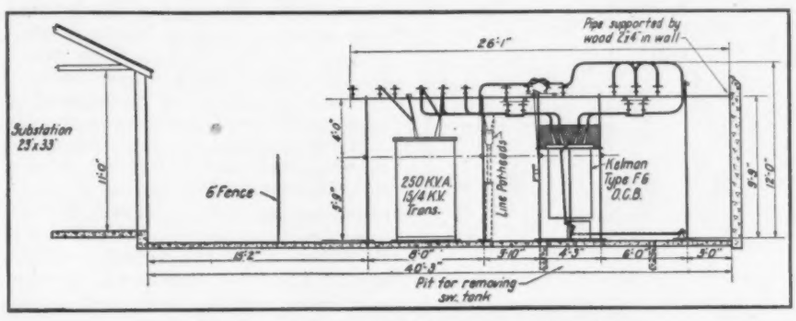


Fig. 3. Section through high-tension equipment.

Special attention is paid to grounding all equipment and pipe frameworks. A network of 4/0 cable connects all apparatus both indoors and outdoors to an electrode in a ground

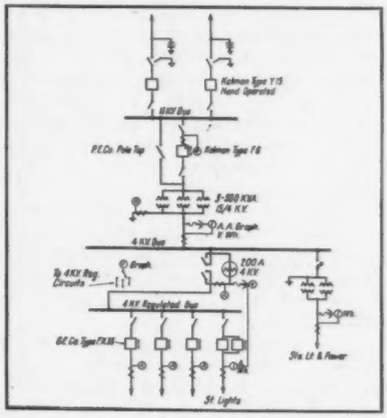


Fig. 5. Single-line wiring diagram showing initial single-bus installation.

well drilled deep enough to reach a permanent water level. In addition, several ground rods are driven at the extremeties of the network. The neutral of the 4-kv. winding on the transformers is connected through a current transformer directly to the ground well terminal block and all the grounded wires on the 4-wire outgoing circuits are brought to the same terminal block.

Although the first of this type of substation has been completed only a short time very gratifying results already have been reported. The company has received letters from real estate men, operating in the district in the immediate vicinity of the substation, commenting on the pleasing appearance of the building and saying that they considered the substation property an asset to the community. Property owners consider that the substation has improved the appearance of their neighborhood materially.

The company has built several substations of the same transformer capacity and the same number of circuits with the outdoor equipment on a steel framework surrounded by a woven wire fence and with overhead line get-away. In those cases the 4-kv. equipment was housed in a sheet-iron building. This was considered the height of economy, but had no regard for appearances. It is interesting to know that the residence type as described herein costs only about 25 per cent more than the ultra economical layout. Aside from the fact that aroused civic pride is making it impossible to secure permits to build the old type of station in many places, there is small doubt but what the better appearing job is a paying investment for the company.

This "residence" type of substation was designed by the department of engineering design and built by the construction department of the Southern California Edison Company in several of the small towns near Los Angeles.

Analysis of Current Transformer Tests—IV

Z-Connected Current Transformers

By E. C. GOODALE, Tacoma, Washington

Frequently it is desirable to secure full line protection against single-phase and polyphase short circuits, using three current transformers but only two relays. Such a scheme of protection is shown in Fig. 17(A). The corresponding vector diagram of the phase relations of the line voltages and currents and the secondary currents at unity power factor is shown in Fig. 17(B). For the sake of simplicity the line voltages were assumed 100 volts balanced 3-phase, the line currents balanced and equal to 10 amp., the current transformer ratios 10/5, and all polarities subtractive.

To find the values and phase relations of the currents flowing through the relays it is necessary to use the form of Kirchoff's current law explained in Part I of this series. (See page 149, Electrical West, March, 1927.) This law states that the current leaving a junction point is equal to the vector sum of all currents entering the point, minus any other currents leaving. Hence, for point d it is evident that I_d vectorially equals $I_a + I_b$. This is shown graphically in Fig. 17(C). From this same law it is apparent that for junction point e the current I_e leaving that point vectorially equals $-I_b - I_c$, or $-(I_b + I_c)$, both of which also are leaving point e. It must be remembered that the directions indicated on the connection diagram are not instantaneous directions, but are "assumed" directions, and that the vector diagram [Fig. 17(B)] shows when the currents flow in the indicated directions. In a similar way it is apparent that I_f vectorially equals $I_c - I_a$.

Phase relations of all the currents with respect to the line voltages are shown in Fig. 17(D). It is apparent here that I_d really is the negative of I_c, and that I_e is the same as I_a. It is timely to mention that vectors may be moved from one location to another without changing their values provided their lengths and directions remain unchanged. Hence the vectors of Fig. 17(C) were moved to the radial diagram of Fig. 17(D) in order to show more clearly the phase-angle relations between them and the line voltages.

Actual Test Data

Agreement between the theoretical and actual test values is supported by the actual test data shown in the accompanying table and in the subsequent discussion of these data. A detailed explanation of the method of obtaining the test data was given in Parts II and III of this series. (See Electrical West, April and June, 1927.) Vector relations of these voltages and currents, plotted to scale, is shown in Fig. 18. In Table III are the test data.

The reference voltage used in determining phase relations was E_{BA}, 114 volts. This voltage vector was assumed as being horizontal and to the right. In phase with it was the reference current I, 10 amp. Current transformer ratios were 10/5. The load was delta-connected and balanced across the three phases, three 250-watt lamps across each phase.

Phase relations shown in Fig. 18 compare favorably with those of Fig. 17(D).

This test was repeated using unbalanced loads consisting of one 250-watt lamp across phase BA, two across phase CB and three across phase AC. The results then were:

Primary currents—
$I_A = 7.55$ at 49-deg. lag.
$I_B = 6.00$ at 144-deg. lag.
$I_C = 9.25$ at 92-deg. lead.

Secondary currents—
$I_a = 3.85$ at 49-deg. lag.
$I_b = 3.10$ at 144-deg. lag.
$I_c = 4.80$ at 92-deg. lead.

Secondary tap currents—
$I_d = 4.80$ at 88-deg. lag.
$I_e = 3.90$ at 49-deg. lag.

Application of Z-connection

A discussion of the application of the Z connection may be found in the 1926 edition of the N.E.L.A. Relay Handbook, pp. 649-651. The main points to bear in mind are:

1. It will protect against single-phase or polyphase short circuits on either Y or delta systems.

2. It will protect against grounds on grounded-neutral Y systems in which the neutral resistance is low enough so that currents approximating short circuit currents will flow.

3. It will protect against grounds on ungrounded neutral Y and delta systems which are large and extensive enough so that the magnitude of the charging current to ground (about twice normal charging current) will equal approximately the normal short-circuit current.

The Z connection may over-protect against single-phase currents circulating in the delta secondary of a grounded neutral Y-delta transformer bank when the neutral of the primary Y is not symmetrical with respect to the three primary lines. Such an "unsymmetrical neutral" will occur if the original source is located a long distance from the bank in question and badly unbalanced Y loads are connected to the same neutral.

In Fig. 19(A) is shown a Z-connected relay scheme on a grounded Y-delta transformer bank the neutral of which is assumed to be "unsymmetrical." All palarities are assumed subtractive and all ratios 1/1 for simplicity. If the neutral had been symmetrical it would have been located, on the vector diagram, at the median point of the tri-

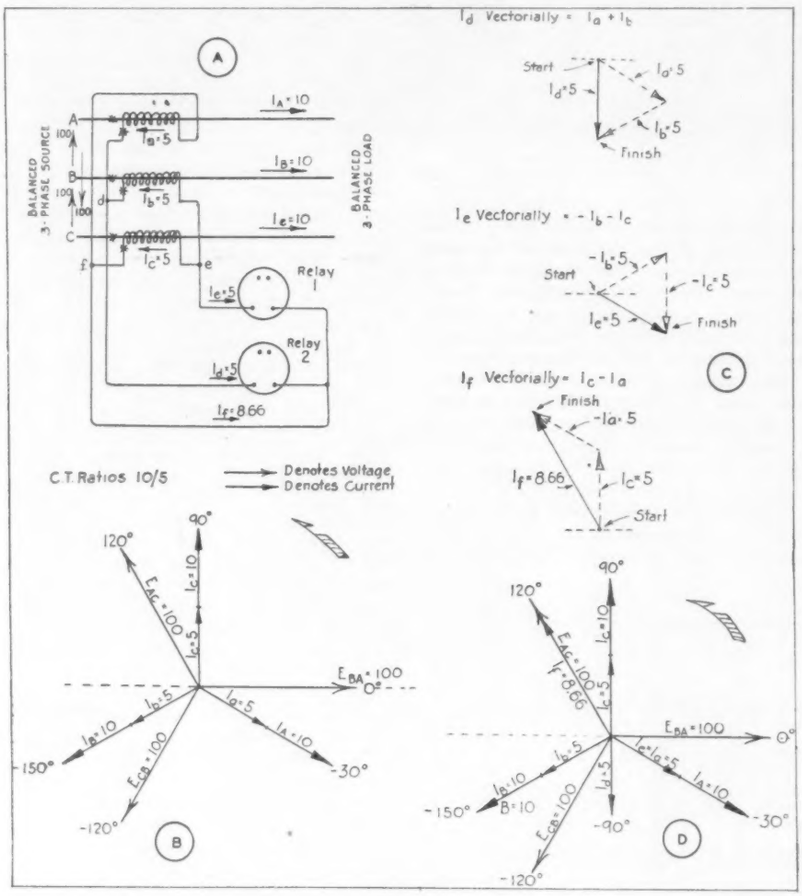


Fig. 17. Circuit diagram showing application of Z-connected current transformer in circuit protection. Also various vector diagrams showing current combinations mentioned in the text.

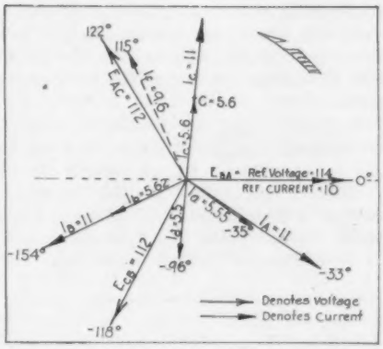


Fig. 18. Vector diagram showing phase relations of test data given in Table III.

angle formed by arranging the vectors of the line voltages in a heel-and-toe order as shown in Fig. 19(B).

To find this median point draw medians (lines) from the vertices A, B and C to the mid-points of the opposite sides. The vector lengths of these medians from the point of intersection, H, to the vertices A, B and C, respectively, would represent the true induced voltages in the primaries of the Y-delta bank, and hence also the induced voltages in their secondaries. This method of finding the symmetrical neutral holds true whether the line voltages themselves are balanced or unbalanced.

It would be found that the vector sum of these induced voltages is zero. See Fig. 19(C). Hence, in considering the closed delta as a closed circuit in itself, it is evident that there is no resultant voltage available to send current circulating around the delta loop. This does not mean that no current could flow in the secondary coils. It simply means that no current normally will flow in the delta coils except that drawn by an external load on the secondary line.

Circulating Currents

Suppose, however, that the neutral were distorted to some location such as point G as shown in Fig. 19(D). It will now be found that the vector-sum of the three induced voltages is not zero as before but is a value equal to three times the length of the vector distance GH. See Fig. 19(E). The reason why this resultant is equal to 3 E_{GH} is apparent since:

E_{GA} vectorially $= E_{GH} + E_{HA}$.
E_{GB} vectorially $= E_{GH} + E_{HB}$.
E_{GC} vectorially $= E_{GH} + E_{HC}$.

But:

$E_{HA} + E_{HB} + E_{HC}$ vectorially $= 0$. See Fig. 19(C).

Therefore:

$E_{GA} + E_{GB} + E_{GC}$ vectorially $= 3\ E_{GH}$.

This resultant, 3 E_{GH}, forces a circulating current I around the delta that according to Ohm's Law is equal to the voltage 3 E_{GH} divided by the total impedance, 3 Z, of the three transformers considered in series for the delta circuit; Z being the ohms impedance of one of the transformers. Hence the circulating current $I = \frac{E_{GH}}{Z}$

Apparently, then, when a Y-delta transformer bank has an unsymmetrical or unbalanced primary neutral a circulating current will flow in the delta of the secondary. The magnitude of this circulating current may be determined by dividing the volts unbalance by the ohms impedance of one of the transformers. Since transformer impedance is mostly inductive this circulating current, I, will lag perhaps 75 deg. behind the voltage of unbalance, E_{GH}. Suppose E_{GH} were 10 volts and Z were 2 ohms.

Then $I = \frac{E_{GH}}{Z} = \frac{10}{2} = 5$ amps. See Fig. 19(F).

Referring to Fig. 19(A) it is apparent: that the 5-amp. single-phase current I, will circulate around the delta secondary; that $5+5+5=15$ amp. will flow from the three primary legs to ground, returning to feed the loads causing the unbalance; and that $5+5=10$ amp. will flow out through relay II and back in relay I. Since under normal balanced conditions only 5 amp. flows in the relays for each 5 amp. in the current transformer secondaries it is evident that in this special case the circuit is over-protected. However it obviously is desirable here since circulating currents needlessly decrease the capacity of the bank and hence should be eliminated either by balancing up all the other Y-connected loads or by cutting free the neutral of the bank.

It will be found that a single-phase short circuit on phase BA [see Fig. 17(A)], will send current down conductor A to the short and back on B. Hence I_a will be zero and consequently relay II will not operate. Relay I will operate, however, since current I_a will be directly proportionate to the current returning over conductor B. Similarly a short circuit across phase CB will operate relay II but not relay I. A short on phase AC will operate both relays.

It is apparent, then, that the Z connection is quite satisfactory for applications in which three current transformers are available but only two relays desired in the interests of economy.

TABLE III—TEST DATA.

	Volts or Amp.		Watts-Switch Down		Cosine of Angle	Angle (Deg.)	Registration-Switch Up	Lead or Lag
E_{BA}	114.00	+	1,140	+	1.000	0	Slight Change	In Phase
E_{CB}	112.00	−	530	−	0.472	118	Increased Neg.	Lag
E_{AC}	112.00	−	590	−	0.526	122	Decreased Neg.	Lead
I_A	11.00	+	1,050	+	0.840	33	Increased Pos.	Lag
I_B	11.00	−	1,125	−	0.900	154	Decreased Neg.	Lag
I_C	11.00	+	80	+	0.060	86	Slight Neg.	Lead
I_a	5.55	+	520	+	0.820	35	Increased Pos.	Lag
I_b	5.62	−	580	−	0.900	154	Decreased Neg.	Lag
I_c	5.60	+	50	+	0.080	86	Slight Neg.	Lead
I_d	5.50	−	60	−	0.100	96	Slight Pos.	Lag
I_e	5.60	+	530	+	0.830	34	Increased Pos.	Lag

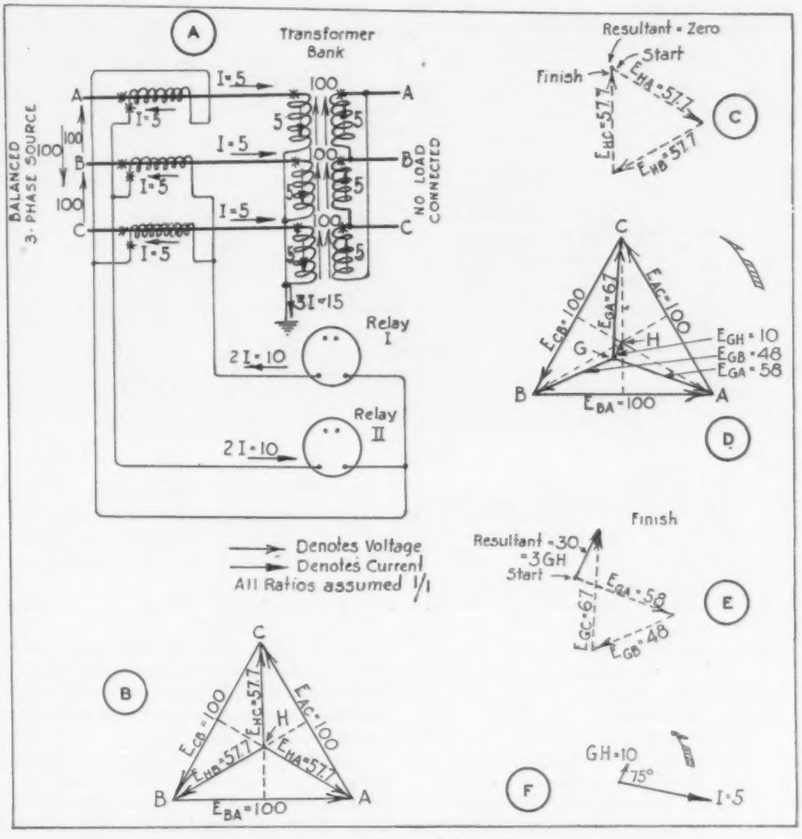


Fig. 19. Illustrations for discussion of circulating currents.

Underground Construction in Residential Areas

Joint Duct Lines Convey Both Power and Communication Circuits to Each Lot and Improve Community Appearance

By CLAYTON BIGGS, Superintendent of Underground Construction, Southern California Edison Company, Los Angeles

Underground construction is justifiable usually because local city ordinances compel underground construction in down-town districts or because of undue congestion of pole lines. However, a third factor influencing underground construction is gaining importance rapidly, particularly in high-class residence districts. This third factor is the improved community appearance incident to the absence of poles and overhead leads.

In the better class of southern California subdivisions community appearance is held highly desirable and as a contributing factor all light, power and telephone mains and leads are being installed underground. In the interest of cost reduction this work usually is done jointly by the power and communication companies and the scheme seems to be working out satisfactorily to all parties concerned.

two different service ducts to enter their respective manholes without any deflection.

In Fig. 1 is shown a plan and sectional elevation of a typical job of double manhole construction. Here it may be noted that each manhole is entirely complete in itself and not affected by any possible goings-on in the adjacent manhole. Further, it may be noted in this illustration that provision is made for easy entrance of duct lines. In this type of construction it is essential that attention be given to the same points that would control underground construction in an extremely heavy down-town load section or, for that matter, anywhere. These points are: quality and economy in construction, ample manhole and duct capacity, full flexibility of feeder lines in case of possible overload or trouble.

Due to the varying construction load

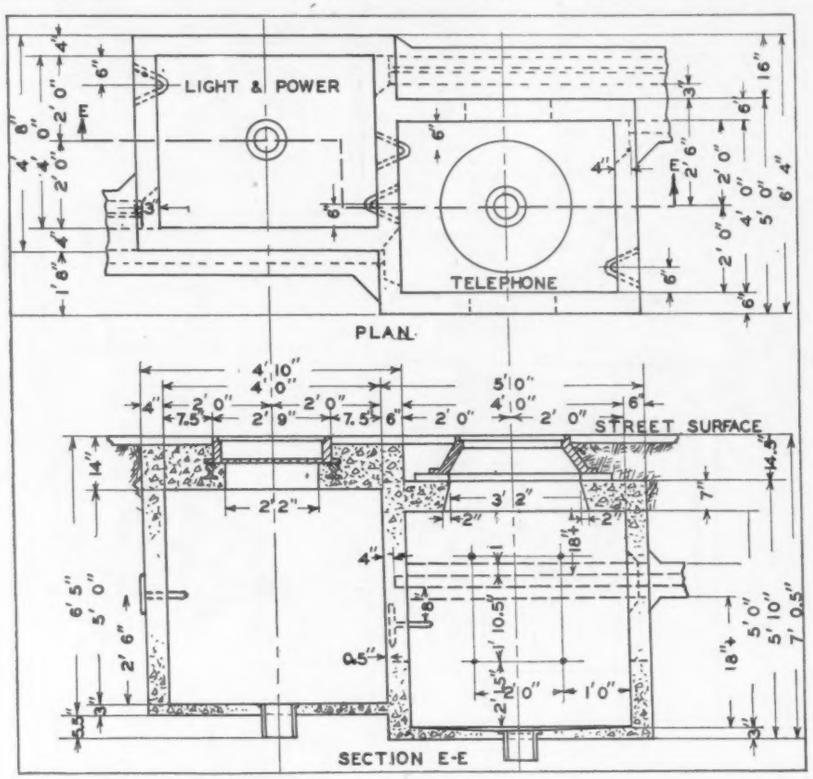


Fig. 1. Plan and sectional elevation showing typical double manhole construction used by power and communication companies in southern California for subdivision services.

Of course, the same ducts are not used for both power and communication leads, but the duct line for both of these services may be laid in the same trench. Further, the manholes may be located together or at separated points, as local conditions seem to demand. When both manholes are installed at the same location the two manholes are slightly staggered thus permitting the factor it is usual to do this type of underground construction by contract. Both electric and telephone conduit and manhole are installed at one time and under one contract.

Service laterals for both companies are run from the manholes to a point 1 ft. inside of the property line of each lot. Thus both power and communication service is made immediately available to each lot in the subdivision requiring only the extension of the conduit line from the property line on to the house and the actual pulling of the conductors themselves.

Ordinary manholes usually are 4x4x5 ft. in dimension and transformer vaults either 5½x6½x6 ft. or 6x8x7 ft. in dimension according to the class of houses to be built and the expected load. Main conduit lines are 3-in. fibre cast in concrete and so arranged that the

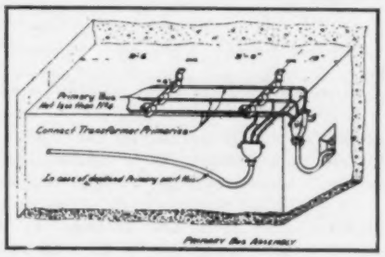


Fig. 2. Primary bus arrangement for transformer vaults in subdivision underground construction.

telephone ducts are grouped together at one side of the trench and the power ducts grouped together at the other side. Service laterals are metal conduit in practically all cases, sizes from 1¼ to 2½ in. being used for power and light leads and conduit from ¾ to 1½ in. for telephone service. Minimum size of service leads used is No. 6 copper. In districts where ordinances so require, single-conductor lead-covered service leads are run and these are sleeved and wiped direct to the main secondary cables. Where city ordinances do not regulate, a high quality rubber-covered wire is used for service leads and each of these circuits is fused in a weather-proof cut-out box located in the manhole.

Primary feeders in common use in this class of service are single and 3-conductor, paper-and-lead-covered, 5-kv. cables using No. 2, No. 4 and No. 6 sizes as load conditions require. Secondary leads range from No. 2 up to 2/0 single-conductor, paper-and-lead covered cables with 1.5-kv. instulation.

In districts operating a 4-kv. grounded primary system and where secondary and primary cables parallel in the same duct-line group a common grounded neutral is used for both primary and secondary. This ground is installed if possible at the time of duct-line construction so that it may be laid directly in the trench, thus leaving all of the duct lines entirely free for the lead-covered cables.

Overhead type of transformers generally are used for this subdivision work instead of the subway type. The preferable means of mounting these transformers in manholes is to hang them on the wall where possible or to mount them on an angle-iron platform as a second choice. Physical arrangements of primary leads in the transformer vault are shown in Fig. 2. The arrangement here shown is common to these subdivision transformer vaults.

Where these underground duct runs are built along property lines or where there will be no heavy traffic passing directly over them it is common to use light weight castings for the hanhole covers. Pull-boxes or hand-holes are not allowed except under very unusual circumstances.

Construction costs for this under-underground subdivision construction vary from $3 to $4 per ft. or an average of from $100 to $150 per lot complete and ready for service with conduit strung into each lot. Of course, these prices depend upon the number of lots in the tract, the plan of the subdivision and the soil condition. Naturally, in hilly and rocky country the cost of excavation and transportation is increased.

To insure construction up to the standards covered in the specifications and contract an inspector or other representative of either the power or the communication company is on the job every day if necessary, or as often as is necessary to insure proper construction.

No metal is worth a dawgone without temper. If you have any mettle in you, hold your temper.—Glow.

Fiber Fuse Puller Is Convenient, Safe and Durable

By A. KANEKEBERG, Electric Distribution Department, Public Service Company of Colorado, Denver.

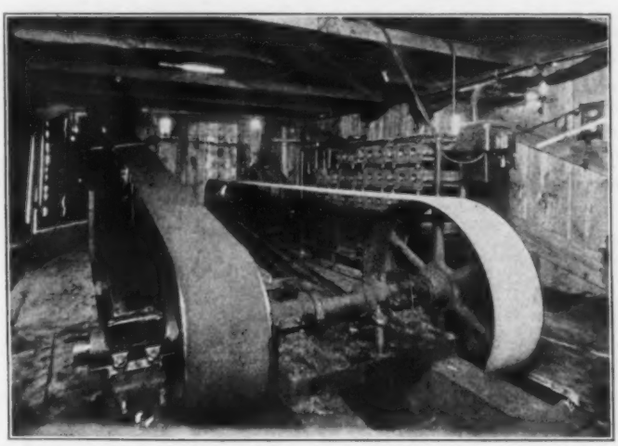
Fuse pullers such as shown in the accompanying illustration have been developed by the safety and claim department of the Public Service Company of Colorado. The device is made in the shops of the company at Denver and with the exception of the metal fasteners is entirely of hard fiber. Handles and jaws are machined from red fiber and the hinge portion is fashioned from black sheet fiber.

Inasmuch as raw fiber is hygroscopic and therefore may contain sufficient moisture to reduce greatly its insulating qualities these pullers are carefully machined and polished to a high gloss. This increases the surface resistance and gives the finished product a better appearance. Further to increase the insulating qualities the device is given a coating of varnish.

The finished fuse puller is convenient to use, is not easily broken and is safe for use on circuits up to 4 kv. The particular one shown in the illustration has an over-all length of 15 in., but the design is flexible as far as dimensions are concerned.

Handy fuse puller that is more convenient and much safer than fingers.

Electric Power in Colorado Well Drilling



A hole in the ground may eventuate into an oil well or perhaps prove to be only a "duster." In either event there usually is a story to be told. In the case of the Johnson No. 1 test well of the Roland Oil Company near Denver, shown above, the story is of the economies of electrical drilling. The history of this test hole covers a period of only 19 months, but includes drilling to a depth of 7,300 ft., placing the casing and removing it subsequent to abandonment, and one complete rebuilding of all surface equipment as a result of a fire. These results constitute not only a depth record for the district, but also a speed record for drilling procedure. This is particularly emphasized when it is understood that operations were carried on only six days per week. Figures in direct comparison with steam drilling are not available because no previous test hole in Colorado has been drilled to a depth greater than 5,500 ft. It is significant that the drilling company stated that deep drilling operations could be carried on more economically with purchased electric power than with steam power even though the drilling company could supply oil from its own Oklahoma wells at half the market price. Power consumption varied from 480 to 25,200 kw-hr. per month and the net rate varied from 9 to 2.21 cents per kw-hr. The total light and power bill for the entire job amounted to $6,479.25, an average of 90 cents per foot of depth and an average of 3 cents per kw-hr. The drilling equipment is transported from place to place with ease. Power was supplied by the Public Service Company of Colorado over 2½ miles of 6.6-kv. pole line. The pole line expense was carried by the drilling company which received monthly rebates on power bills varying in amounts in accordance with monthly power consumption, a policy pursued by the Public Service Company in supplying remote loads of this nature.

C. H. VIVIAN.

Connection Checks for Polyphase Watthour Meters—II

By D. T. Canfield, Instructor in Electrical Engineering, Purdue University, Lafayette, Ind.

CHECK No. 3

The Brown Check

Special Apparatus: A high non-inductive resistance of 10,000 ohms or more.

Procedure, steps in order:

1. Be sure the load is approximately balanced.
2. Determine whether the power factor is leading or lagging.
3. Be sure the proper current and potential elements are combined in the same meter element.
4. So connect the current leads to their respective current coils as to obtain forward rotation for the meter as a whole.
5. Determine which is the heavily loaded or fast moving element by opening each potential circuit in turn.
6. Disconnect the fast moving element by opening its potential circuit.
7. Insert the high resistance in series with the potential coil of the slow moving element. (See Fig. 4.)
8. Note the direction of the rotation of the disc.
9. Remove the high resistance and replace all leads.

Interpretation:

Rule 1. If Step 2 shows a lagging power factor and Step 8 backward rotation, the meter is correctly connected.

Rule 2. If Step 2 shows a leading power factor and Step 8 forward rotation, the meter is correctly connected.

Rule 3. If in Rule 1 the meter rotates forward and in Rule 2 backwards it is improperly connected.

Advantage:

1. Effective on any Class of meter but Class C.

Disadvantages:

1. Special apparatus is needed.
2. Some lead tracing is necessary.
3. Some knowledge of the power factor is required.
4. Difficulty in determining the fast and slow elements at power factors near unity.
5. Approximate load balance is required.

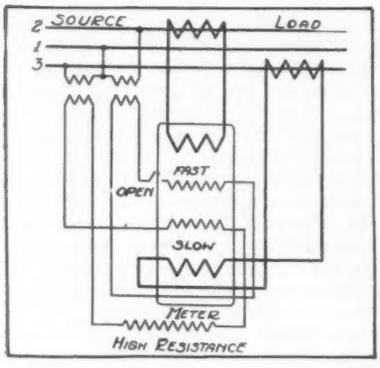


Fig. 4.—Illustration of Check No. 3.

CHECK NO. 4

The Kouwenhoven Check

Special Apparatus: None.

Procedure, steps in proper order:

1. Be sure the load is approximately balanced.
2. Determine which class of connections is used.
3. Determine the two potential leads that are connected to the line wires that furnish current to the current coils. (See Figs 5 and 6, leads x and y.)
4. Be sure that the common potential leads are not connected to the same coil as in Figs. 5 and 6 (d).
5. Be sure that the common potential leads are not connected to a line wire that furnishes current to a current coil as in Figs. 5 and 6 (e).
6. Interchange leads x and y, as found in Step 3, at the meter for Classes A and B and on the primary side of the potential transformers for Classes D, E and F.
7. Note the speed of rotation, if any.

Note: For Class A meters Steps 4 and 5 may be omitted. For Class B, E and F meters Steps 4 and 5 reduce to make sure that the common potential lead P_2 is connected to the proper line wire.

Interpretation:

Rule 1. If after Step 7 the meter stops or runs very slowly in either direction the meter is correctly connected.

Rule 2. If after Step 7 the meter runs forward at increased speed, restore the voltage connections as they were originally before Step 7 and reverse that current coil that will give forward rotation after reversal.

Rule 3. If after Step 7 the rotation is forward at reduced speed, in the neighborhood of ½, leave the voltage connections as they are after Step 7 and reverse that current coil that will give forward rotation after reversal.

Rule 4. If the meter rotates back-

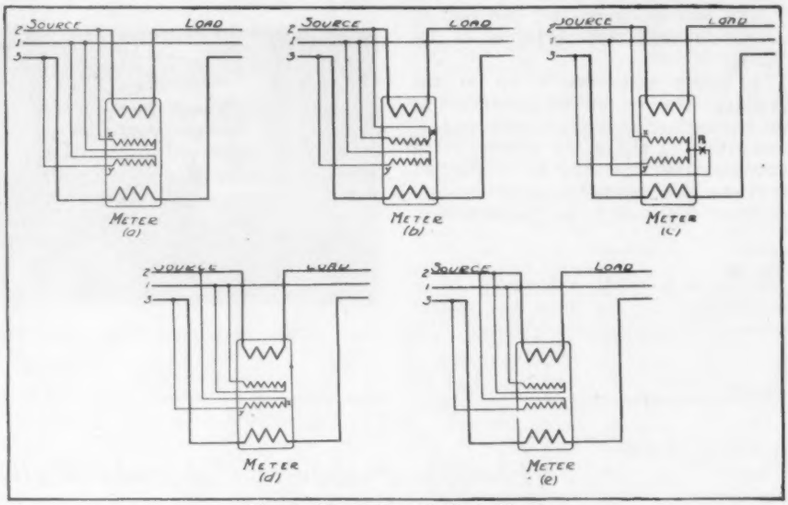


Fig. 5.—Illustration of Check No. 4.

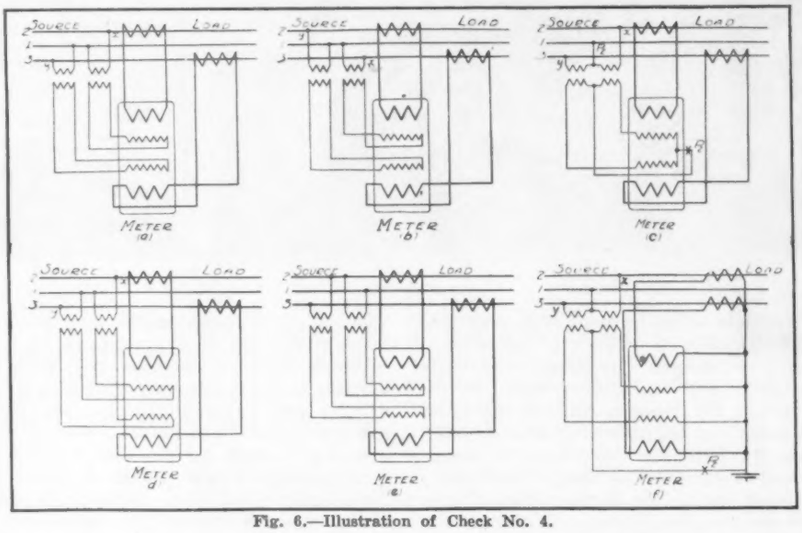


Fig. 6.—Illustration of Check No. 4.

wards at any appreciable speed after Step 7 the connections are hopelessly wrong and the meter should be entirely rewired.

Advantages:

1. No knowledge of the power factor is required.
2. Information is available to correct the connections should they prove to be wrong.

Disadvantages:

1. Considerable lead tracing is necessary.
2. Approximate load balance is required.

Note: By modifying Rule 1 slightly and excluding Rules 2, 3 and 4, this check may be used on unbalanced circuits, but the conditions surrounding its application under such circumstances are so numerous and complex that it has not been included in this discussion.

CHECK NO. 5
For Class C Meters

Special Apparatus: Stop watch.

Procedure, steps in proper order:

1. Connect the meter so that it rotates in the forward direction with all leads intact.

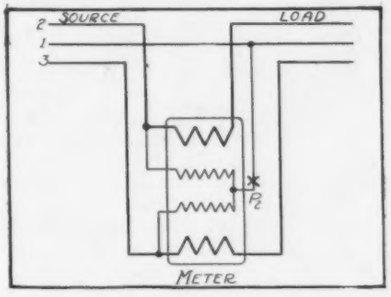


Fig. 7.—Illustration of Check No. 5.

2. Be sure the load remains constant during the time of making the check.
3. Time one revolution of the disc.
4. Open the common potential lead P_2 Fig. 7, at a point as shown so that the two potential coils are still strapped together.
5. Note the direction of the rotation of the disc.
6. Time one revolution of the disc.
7. Replace lead P_2.

Interpretation:

Rule 1. If Step 5 shows forward rotation and if in Step 6 the time is approximately twice that in Step 3 the meter is correctly connected.

Rule 2. If the meter does anything else it is improperly connected.

Advantages:

1. No knowledge of the power factor is required.
2. It is not necessary that the load shall be balanced.

Disadvantages:

1. Some lead tracing is necessary.
2. The load must remain constant while the check is being made.

Editor's Note.—This is the second of a series of four articles taken from Bulletin No. 8 of Purdue University Extension Service. The third will appear in a subsequent issue and will cover the Jones check and an example of its application to a typical problem.

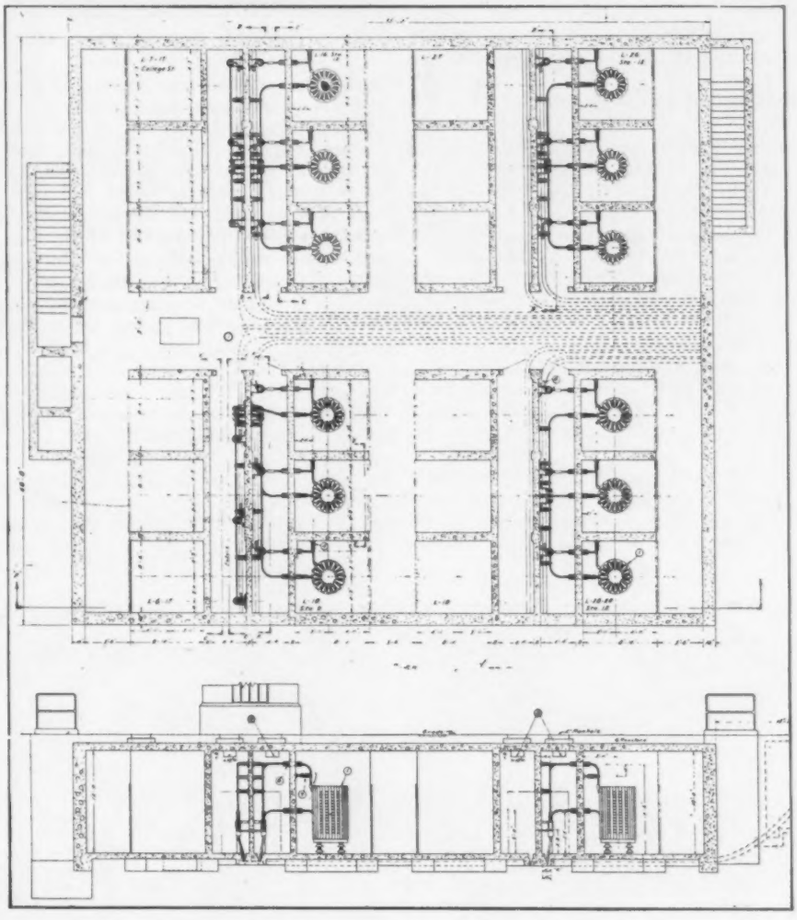
Underground House Provides Space for Reactors in Congested Station

Available space at or above ground level at the Los Angeles Bureau of Power and Light central receiving substation No. 1 has caused the Bureau to construct an underground reactor house. Possible short-circuit energy amounting to 857,000 kva. together with the necessity for providing for parallel operation of overhead and underground feeders were the two outstanding operating problems the solution of which was the installation of reactors. The underground location was chosen because no other feasible space was available.

As indicated in the accompanying illustration the reactor house is entirely underground and is of reinforced concrete construction. It is located immediately outside of the present substation building thus facilitating the routing of the outgoing lines from the substation bus through the reactor house and out. The present size of the reactor house will accommodate eight underground feeders each equipped with three single-phase reactor units. The design is such that the entire layout may be duplicated to provide double the facility.

As shown in the illustration the cable leads from the substation enter the reactor house at the center and traverse the center of the building under the central aisle fanning out to each of the reactor positions. As may be noted conduit has been placed for all eight positions but cable is drawn into only four positions at present.

Each circuit is equipped with a "cast in concrete" reactor rated at 120 kva., 50 cycles, 600 volts reactive drop, 200 amp. with 3 per cent reactance at 12,000 kva. Each reactor unit is installed in a separate concrete compartment and is connected by means of varnished cambric cables through the cell wall to the pothead gallery from which 35-kv. single-conductor lead-covered cables lead into the substation. From this pothead gallery 3-conductor lead-covered 35-kv. cables are run to the distributing stations served by these underground lines. To prevent possible motion under stress the reactor feet are bolted to the concrete floor. Other construction details may be gained by close reference to the accompanying illustration.



Plan and sectional elevation of underground reactor house showing physical arrangement of equipment and leads

Ideas for the Contractor

New Ferries Fully Equipped Electrically

Passenger Ships Recently Placed in Service on San Francisco Bay Designed for Ease in Handling and Comfort of Patrons

Electrical ferry service may not be particularly new, but the quality of service provided by the electrically driven and appointed ferries, Yerba Buena and Peralta, newest craft of the ferry fleet of the Key System Transit Company of Oakland, plying between San Francisco and East Bay points, is claimed to surpass that of most of the electrically appointed ships recently built. To call them ships is no misnomer for the ships' architects and engineers, Smith, McCauley and Hibbs, determined to make them ships in the true sense rather than floating boxes as ferries sometimes are.

Electrical equipment of the ferries installed by the NePage McKenny Company, electrical contractors, under the direction of A. R. Kohls, is particularly complete. Two sets of boilers furnish steam to the main turbo-generator, a 1,900-kw., 600-volt unit to which is direct-connected a 200-kw., 125-volt exciter. An auxiliary turbo-generator set supplies power for general motor and illumination uses of the ships independent of the main power equipment. Each ship is driven by two propulsion motors located at each end of the hull, each of which is a double-armature type motor with a maximum horsepower of 2,600 at 600 volts. A turbine is provided with an over-speed trip.

The main switchboard is built up of eight panels—steam panel, signal panel, power and light panel and panels for the control of auxiliary motors—each of which is provided with stop and start buttons. An emergency lighting system fed from 20-volt Edison storage batteries is provided in the engine room. The same storage battery equipment is used to energize all signals from these storage battery units.

Control of the entire movement of the boat is provided by means of a supervisory control system. This gives the pilot in the pilot house absolute control of the ship's movement. The steering apparatus is electrically controlled, a very small wheel being used in place of the usual large steering wheel. An auxiliary signal system is

One of the pair of steam-electric ferries

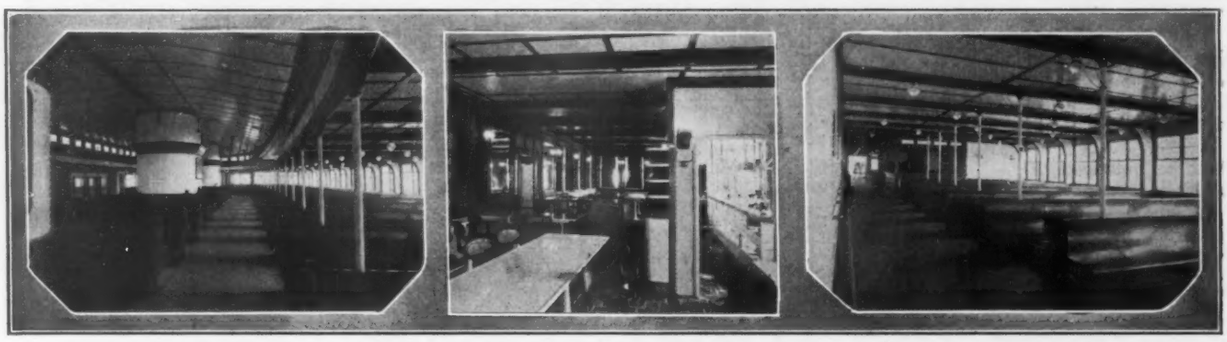
provided in case of emergency. In the pilot house are ammeters; r.p.m. indicators to show the position of the two rudders; the two steering wheels, one for each rudder; reversing stand; searchlight control; compass and mechanical telegraph. On the rear wall of each pilot house is a master clock, fire bell, signal bell, telephone, a "suicide howler," a number of controlling push buttons for signals, steering gear motor control, panel for controlling fog light, searchlight, steering gears and transfer switches. The supervisory control system is a Westinghouse system, practically all electrical apparatus in the boats being of the same make.

Other motor equipment includes fans, fire pump, trimming pumps for ballasting the ship, and two Frigidaire units for the iceboxes in the restaurant.

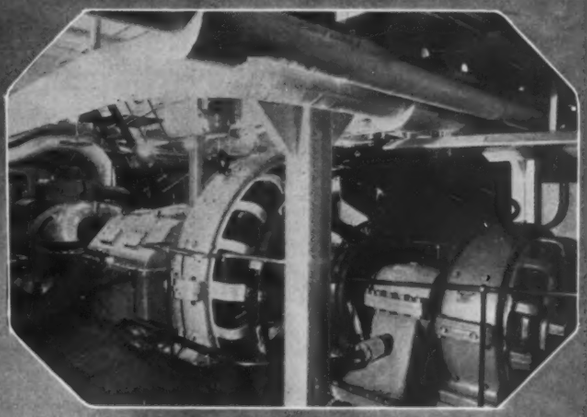
Eight 2,000,000 circ-mil cables of the lead-sheathed and basket-weave armored type are used in the run between generator switchboard and motor equipment. The support of the cable is interesting. A cable rack is built up of 2½ x 2½ x ¼ in. angle-iron framework. The cables in it are held by hardwood blocks, bored to fit each size of cable and then split for convenience in clamping.

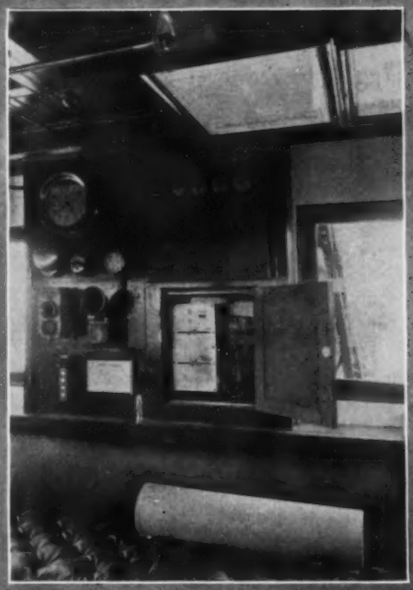
The lighting of the decks is especially well done. On the upper deck lighting equipment consists of 85 ceiling fixtures, using a Holophane globe with a specially cast holder and a 60-watt lamp. In the dome of the main deck to light the central portion of the upper deck a system of cove lighting is used, using Benjamin angle reflectors spaced on 20-in. centers and using 40-watt lamps. Approximately 300 lights are used. An illumination of 10 foot-candles is provided by this system of lighting. On the main deck even better illumination is provided because spacing of the units was not interfered with by the architectural design of the ship. The main deck is lighted by means of 84 100-watt Holophane units, approximately on 9-ft. centers. These units are placed on the beams directly over the seats, and an illumination of more than 10 foot-candles is attained by this method. All wiring is carried by a panel in the engine-room hatch to the light in duplex lead-covered steel-armored cable. The lights are staggered to give a better appearance and a more even distribution of light.

A restaurant and galley is lighted by means of 21 Bonds specially cast two-light bracket fixtures wired on alternate circuits. In the galley the lighting has two 14-slide 5½-kw. toasters, an electric ventilator and an electric dishwasher.



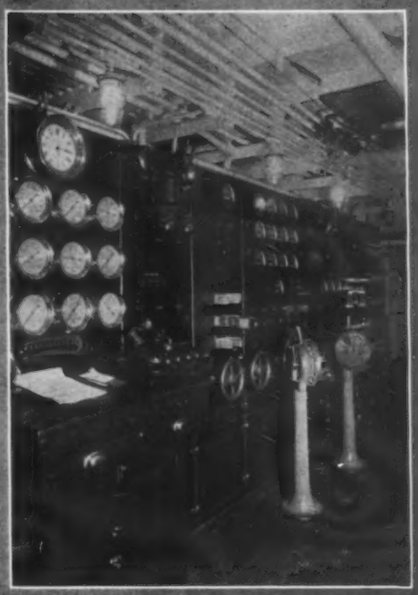
Upper Deck | Restaurant and Galley | Main Deck

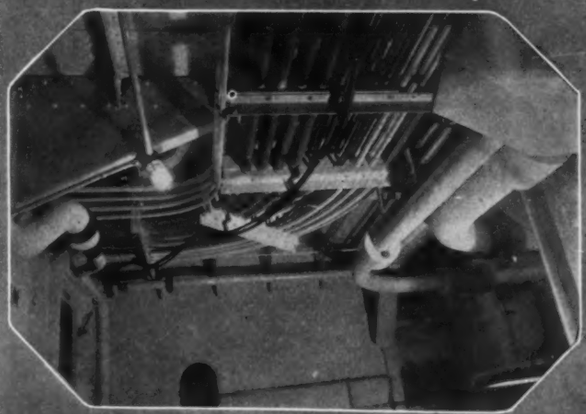


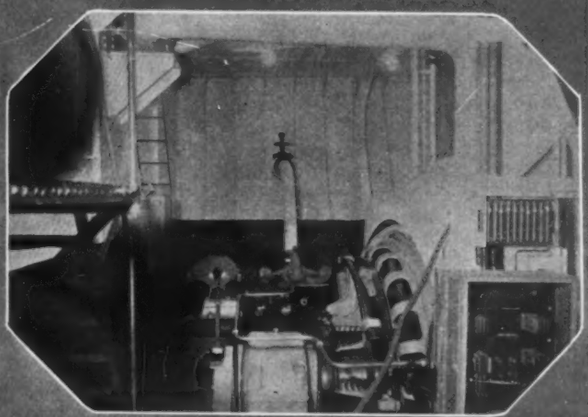


The Last Word In Electric Ferries

Views on this page will give an idea of the high quality electric installation on the new ships of the Key System Transit Company. Above is shown the pilot house where is centralized the full control of the ship, and one of the turbine-generator sets. Other pilot house equipment is shown at the left. The engine-room control board at the left is an example of compact arrangement. Below is shown one of the driving motors and also a typical conduit run.







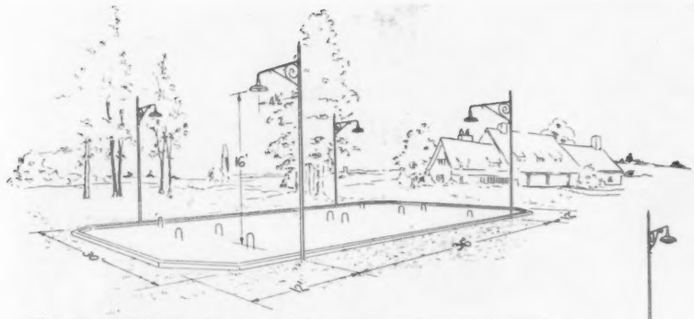


Fig. 2. Lighting arrangement for roque and croquet courts.

Night Lighting for Outdoor Sports—II

Further Extracts from a Recent Bulletin

By. O. F. Hass and H. M. Sharp, National Lamp Works of the General Electric Company, Nela Park.

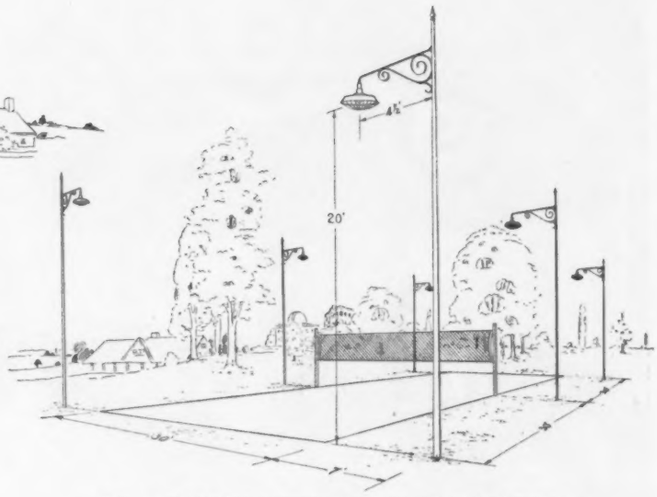


Fig. 1. Lighting arrangement for volley ball court.

IN THE first article of this series, reprinted in the June issue of Electrical West, pp. 473-474, the general problem of night lighting for outdoor sports was considered. Conditions applicable to Western sports were selected and the first problem in lighting, that of illuminating a tennis court, was described. In this issue other types of sports fields are considered and recommendations for lighting them adequately are given.

Swimming Pools

Outdoor swimming pools vary considerably in size and methods of construction which necessitates different lighting treatments. There are, however, four lighting systems which apply in the great majority of instances.

As a rule such municipal pools call for lighting requirements which are very severe. A general overhead lighting system consisting of standard RLM domes placed 20 ft. above the pool and spaced on 30 to 40-ft. centers is recommended. White bowl lamps of 750-1,000-watts should be used. The reflectors should be equipped with disconnecting hangers so as to facilitate maintenance.

Rectangular pools of a size approximately 25 x 50 ft. or 30 x 75 ft. find wide use at country clubs and private homes. Satisfactory lighting for such pools is easily obtained by the use of four elliptical angle reflectors mounted at least 15 ft. above the water along the sides of the pool one-quarter of the length from each corner. Lamps of 300-500 watts should be used, depending upon the area to be lighted.

In many instances pools of this same general type are set in very attractive surroundings, requiring a lighting treatment which is appropriately ornamental. In such cases ornamental street lighting units, four or six in number, depending upon the size of the pool, can be used. These units should be placed along the sides, as were the angle reflectors, and 500-watt clear Mazda lamps should be used.

Large pools, that is those whose area is greater than 10,000 sq.ft., are usually most satisfactorily lighted by means of floodlighting units. These should be mounted at least 40 ft. above the

ground in order to reduce glare and to secure the proper spread of light. Three or four poles should be used, depending upon the shape of the pool, and sufficient floodlighting units employed to provide about one watt per sq.ft. of pool area.

Volley Ball Courts

In the lighting of volley ball courts glare from the lamps must be reduced to a minimum, since practically all of the playing is done while the ball is overhead. Fig. 1 shows a method of lighting these courts which meets this requirement as well as furnishing adequate illumination of correct distribution. Six 1,000-watt white bowl Mazda lamps are mounted in standard RLM Domes, 20 ft. high on 4½-ft. bracket arms. The supporting poles are located 7 ft. from the sides of the court and 30 ft. apart.

Roque and Croquet Courts

Roque and croquet playing during early evening has always been a popular pastime because of the fact that it is not necessary for the participants to dress in a manner particularly suited for the recreation. Consequently the games fit into practically any evening's entertainment.

A layout for the night lighting of roque and croquet courts which will extend the hours during which this pleasant pastime may be enjoyed is shown in Fig. 2. Four 500-watt white bowl Mazda lamps are employed in standard RLM domes, mounted 16 ft. high on 4½-ft. brackets. The poles are placed along the sides of the court 12 ft. from the end with a 36-ft. spacing between poles.

Horseshoe Pitching Pits

Horseshoe pitching, or quoits, is rapidly becoming popular as an evening recreation because it is a sport peculiarly fitted to the "after work" hours. Park, playground, and recreation field officials are installing the pits in large numbers, for the space required is small and the outlay for equipment slight. The lighting requirements are very simple and easily met. A typical layout provides for a 200-watt white bowl Mazda lamp in an RLM dome, mounted 10 ft. high on a 6-ft. bracket arm. The supporting pole is placed behind and mid-way between two adjacent pits; it may also be used to support the score board.

Football Fields

Football fields are used for track meets, pageants and similar events of a spectacular nature, as well as for football games and practice. The lighting system should be designed with this in mind. In one very satisfactory system there are four towers employed, each at least 70 ft. high and carrying 15 floodlights, each of which uses a 1,500-watt Mazda lamp. (These may be arranged in some characteristic letter or symbol of the school.) The distance from the group of floodlights to the edge of the playing field should not exceed 100 ft.

Demand Factors Determine Installation Equipment

Diversity Studied Over Eighteen Month Period by San Joaquin Light & Power Corporation to Assist Contractors in Installation for Safety

By E. J. CRAWFORD, San Joaquin Light & Power Corporation

THE accompanying tabulation prepared by the San Joaquin Light & Power Corporation, showing wire, switch and fuse sizes and demand factor applicable to installations of various heating and cooking appliances installed in residences, was made to supply a definite need.

There has been a consistent call throughout our territory, from contractors and wiring firms who want to install an adequate job, for some reliable guide that would assist them in determining the proper wire and accessories to install for various connected loads and distances.

No reliable information appeared to be available, although we all knew that a diversity factor was applicable.

To determine the correct answer a graphic record was obtained from numerous installations in all sections of our territory over a period of approximately eighteen months. Enough of these were plotted, as shown in Fig. 1, and a curve was drawn through the maximum points. This then results in a conservative figure for per cent demand for a given connected load.

In order not to have too many standards this curve was blocked off into ten sections covering load from 0 to 66 kva. These blocks were formed so that there was ample allowance made to cover demands which might be in excess of those found on our tests.

From the demand obtained the amperage for the largest load in the block was calculated, as this is the figure which determines all the balance of the table.

This current is the maximum current allowable for the minimum wire size shown in the same block. The other wire sizes in each block are those necessary for the longer runs shown, to allow for 1 per cent drop.

It will be seen, therefore, that every effort has been made to stay on the safe or conservative side.

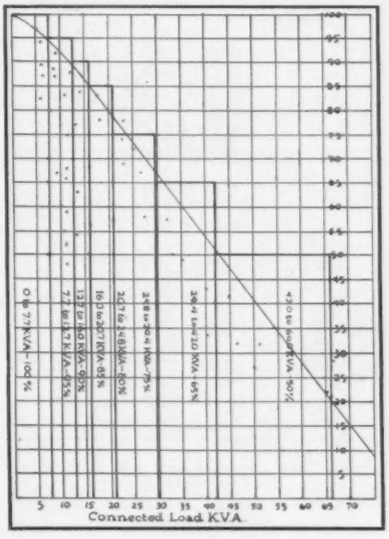


Fig. 1.

Explanation of Table

Column 1 is the total connected load in kva. This should include all appliances.

Column 2 is the demand factor that may be applied to this connected load to obtain the probable maximum demand. This factor will vary greatly for different installations and great care should be exercised in its use so that switches, fuses, etc., will not be too small.

Column 3 is the maximum demand that will result from columns 1 and 2.

Column 4 is the maximum amperes at 220 volts that will flow with the highest demand shown in column 3. Note that for an impressed voltage higher than 220 volts these values will be increased.

Column 5 shows wire sizes that may be used for the current values shown in column 4. The smallest size shown is the minimum allowed by the National Electrical Code and the California Industrial Accident Commission.

Column 6 gives the maximum fuses allowed by the National Electrical Code and the California Industrial Accident Commission for the wire sizes shown in column 5.

Column 7 shows the switch size necessary for the fuses given in column 6.

Column 8 shows the distance in feet (one way) that will result in a drop of 1 per cent when wire sizes as shown in column 5 and amperes as in column 4 are used.

Note. In the table the voltage at the appliance is assumed at 220 volts or the load balanced on a 110-220-volt, three-wire system. Should there be appreciable unbalance proper allowance should be made.

This table applies to residence installations or the equivalent. The demand factors assumed will not apply to commercial cooking or heating installations.

It is recommended that wire sizes be used for heating and cooking installations such as to limit the drop to 1 per cent, or 2.2 volts based on 220 volts from the service switch to the appliance. For the majority of installations this will follow if the minimum allowable wire size is used.

Where long runs are necessary it will be advisable to increase the wire size. Care should be taken that the use of the minimum wire size does not limit the maximum allowable fuse to a size that will not properly handle the demand.

Following is an example of the use of the accompanying table for determining wire, switch and fuse sizes:

Installation.	7.5 kw. range.
	5.0 kw. water heater.
	5.0 kw. air heater.
	1.5 kw. lights and small appliances.
	19.0 kw. installed.

TABLE FOR WIRE, SWITCH AND FUSE SIZES AND DEMAND FACTORS FOR INSTALLATIONS OF VARIOUS HEATING APPLIANCES IN RESIDENCES

San Joaquin Light & Power Corporation

Connected Load in Kva.	Demand Factor %	Maximum Demand	Maximum Amperes at 220 volt	Wire Size	Maximum Fuse	Switch Size	Length of Line for 1% Drop
1	2	3	4	5	6	7	8
		0		10	25	30	41′
0 to 5.5	100	to	25	8	35	60	66′
		5.5		6	50	60	105′
				5	55	60	132′
5.6 to 7.7	100	5.6		8	35	60	47′
		to	35	6	50	60	75′
7.8 to 8.1	95	7.7		5	55	60	95′
				4	70	100	119′
		7.8		6	50	60	52′
8.2 to 11.6	95	to	50	5	55	60	66′
		11.0		4	70	100	83′
				3	80	100	105′
11.7 to 12.7	95	11.1		5	55	60	60′
		to	55	4	70	100	76′
12.8 to 13.4	90	12.1		3	80	100	96′
				2	90	100	120′
13.5 to 16.0	90	12.2		4	70	100	60′
		to	70	3	80	100	75′
16.1 to 16.9	85	14.4		2	90	100	95′
				1	100	100	120′
17.0 to 20.7	85	14.5		3	80	100	66′
		to	8	1	100	100	105′
20.8 to 22.0	80	17.6		1/0	125	200	133″
			0	2	90	100	83′
22.1 to 24.8	80	17.7		2	90	100	66″
		to	90	1	100	100	93″
24.9 to 26.4	75	19.8		1/0	125	200	118′
				2/0	150	200	148′
26.5 to 29.4	75	19.9		1	100	100	84′
		to	100	1/0	125	200	106′
29.5 to 33.9	65	22.0		2/0	150	200	133′
				3/0	175	200	168′
34.0 to 42.0	65	22.1		1/0	125	200	85′
		to	125	2/0	150	200	107′
42.1 to 55.0	50	27.5		3/0	175	200	134′
				200M	200	200	160′
		27.6		2/0	150	200	89′
55.1 to 66.0	50	to	150	3/0	175	200	112′
		33.0		200M	200	200	133′
				4/0	225	400	141′

Demand factor = 85 per cent from column 2.
Demand = 19 × .85 = 16.15 kva.

Service switch to distribution center = 40 ft.
Distribution center to range = 20 ft.
Distribution center to water heater = 25 ft.
Distribution center to air heater = 50 ft.

From the table, the minimum sizes are:

Service switch	100 amp.; 80 amp. fuse
Range switch	60 amp.; 35 amp. fuse
Water heater switch	30 amp.; 25 amp. fuse
Air heater switch	30 amp.; 25 amp. fuse

Service to distribution center, No. 3 wire drop = 0.56%.

Distribution center to range, No. 8 wire drop = 0.42%.

Distribution center to water heater, No. 10 wire drop = 0.56%.

Distribution center to air heater, No. 10 wire drop = 1.1%.

To obtain drops proceed as follows:

Service switch to distribution center—No. 3 wire for 17.6 kva. will allow 66 ft. for 1% drop. That load at 40 ft. will result in 40/66 × 1% = 0.607%.

From the above the total drops to the different appliances are:

Range	0.56 + 0.42 = 0.98%
Water heater	0.56 + 0.56 = 1.12%
Air heater	0.56 + 1.10 = 1.66%

Of these all are allowable except the air heater which is high. In order that it should approximate 1 per cent drop, a larger wire than No. 10 should be used. There is a drop of .56 per cent to the distribution center, therefore .44 per cent is all that can be allowed for the run to the air heater. From table No. 6 wire will transmit 5.5 kva. 105 ft. with 1 per cent drop. It will transmit 5 kw. 50 ft. with .43 per cent drop. Therefore the total drop with No. 6 wire will be .56 + .43% drop = 99% drop.

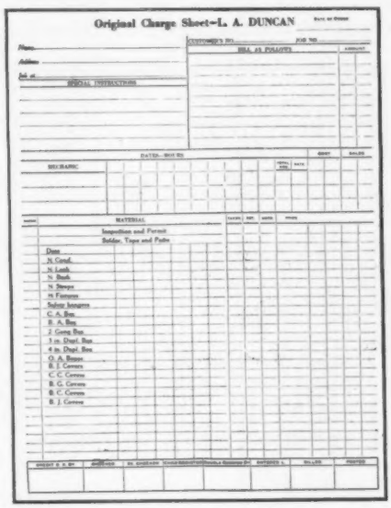
Matching List with Bins Saves Time for Contractor

L. A. Duncan, contractor-dealer of Los Angeles saves nearly 50 per cent over the time formerly required by workmen to assemble materials for an outside job by matching the material bins with a printed list of the items needed on the average job.

Obviously there are certain articles needed on every electrical job of importance, and a workman should take these materials with him to every job to which he is assigned. In order to keep the men from forgetting some of the items and thereby losing time sending back to the shop, Mr. Duncan had printed a list of all the ordinary materials used; and he requires that each workman take this list and select his materials according to it.

Formerly the articles were placed at random in the stock shelves. Now they are arranged in the shelves in the same order as they are printed on the stock list. A workman simply takes the list, goes to the first shelf, gets the item at the top of the list, takes from the second shelf or bin the item listed second on the sheet, and so on. Mr. Duncan estimates that by matching the materials in the bins with the list he has cut by half the time formerly required to go through the stock bins at random and pick out the needed materials.

It is easy to assemble materials for the job when the bins are marked and placed in the same order as on the material list.


Original Charge Sheet—L. A. DUNCAN

Complete material list and job data sheet used by Duncan.

Modern Lighting Invades the Barber Shop

Before barber shops became bobber shops they were akin to the pool parlor as one of the last stands of masculinity. With an eye to the adornment of the male of the species it was only natural that the barber shop should have been the first to pioneer in improved surroundings and equipment. The hydraulic chair succeeded the mechanical one, and the electric clipper succeeded the old hand clipper. But to the matter of lighting it has been only recently that attention has been given. The importance of this medium in the aid of the barber to produce the most delicate effect has now come to be recognized.

The usual barber shop lighting consists of a number of bracket lights placed close to mirrors and throwing a thousand dazzling reflections into the eyes of customer and practitioner alike. To supplement these bracket lights the usual thing is to drop a 200-watt clear lamp to within a few inches of the patient in order that the barber might see more clearly. The intent is good but the principle bad.

Large city shops have not been hard to convince of the value of well modulated and evenly diffused light from ceiling fixtures mounted high above the chairs. The barbers in the smaller cities, however, have clung to their precious brilliancy of brackets in spite of all.

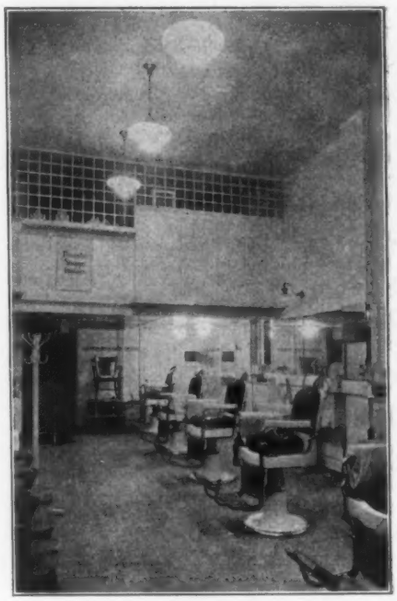
One progressive barber, E. J. Gratton, operating a barber shop and beauty parlor in San Luis Obispo, Calif., was convinced by his electrical contractor, Cline's Electric Shop, to try an installation of lighting in his new barber shop in the Anderson Hotel. He made tentative arrangements to try the lighting suggested by Mr. Cline, but when it was installed was so well satisfied that he has been an ardent booster for lights and electricity ever since.

An installation of Ivanhoe Ace lighting units was made in the new shop and all brackets eliminated. The lighting produced is of a very even quality throughout the shop; no shadows are possible anywhere.

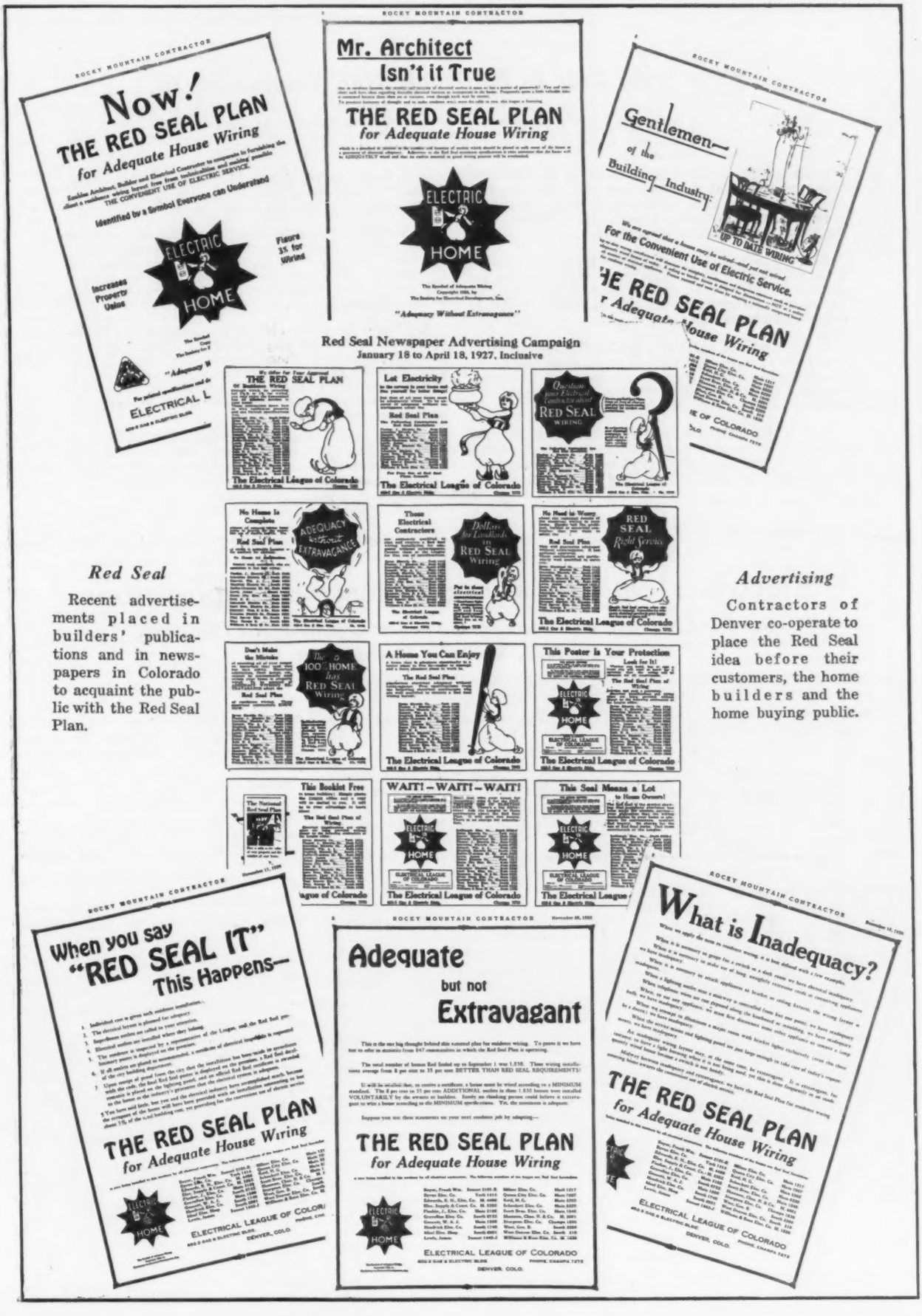
Success with the lighting caused Mr. Gratton to consider greater use of electricity in his home. When he built a home in San Louis Obispo he made it a Red Seal home and has equipped it fully electrically. His home contains electric range, water heater and air heater and an abundance of lighting and convenience outlets.

Moreover the example of his barber shop has set a new standard for store lighting in the city of San Louis Obispo.

Telephone Company Advises Public as to Wiring Provisions for Telephone Installation.—A recent pamphlet distributed by The Pacific Telephone & Telegraph Company entitled "In Your Building Plans Remember Telephone Service" is addressed to home builders, building owners, contractors and architects. It advises on the conduit provision for wiring of telephones in buildings of all kinds. Drawings showing conduit installations for telephones are included.



Bracket lights replaced by adequate ceiling fixtures in San Louis Obispo barber shop.


ROCKY MOUNTAIN CONTRACTOR
Now! THE RED SEAL PLAN for Adequate House Wiring
Identified by a Symbol Everyone Can Understand
ELECTRIC HOME
Increases Property Value
Figure 3% for Wiring
ROCKY MOUNTAIN CONTRACTOR
Mr. Architect Isn't it True
THE RED SEAL PLAN for Adequate House Wiring
ELECTRIC HOME
"Adequacy Without Extravagance"
ROCKY MOUNTAIN CONTRACTOR
Gentlemen— of the Building Industry:
UP TO DATE WIRING
For the Convenient Use of Electric Service.
THE RED SEAL PLAN
Red Seal Newspaper Advertising Campaign
January 18 to April 18, 1927, Inclusive
THE RED SEAL PLAN
Let Electricity
Question your Electrical Comforts for about RED SEAL WIRING
No Home Is Complete
ADEQUACY Without EXTRAVAGANCE
Those Electrical Contractors
Dollars for Landlords in RED SEAL Wiring
No Need to Worry
RED SEAL Right Service
Don't Make the Mistake
The 100% HOME has RED SEAL Wiring
A Home You Can Enjoy
This Poster is Your Protection
This Booklet Free
WAIT! — WAIT! — WAIT!
This Seal Means a Lot to Home Owners!
The Electrical League of Colorado
ROCKY MOUNTAIN CONTRACTOR
When you say "RED SEAL IT" This Happens—
THE RED SEAL PLAN for Adequate House Wiring
ELECTRIC HOME
ELECTRICAL LEAGUE OF COLORADO
DENVER, COLO.
ROCKY MOUNTAIN CONTRACTOR
Adequate but not Extravagant
THE RED SEAL PLAN for Adequate House Wiring
ELECTRIC HOME
ELECTRICAL LEAGUE OF COLORADO
DENVER, COLO.
ROCKY MOUNTAIN CONTRACTOR
What is Inadequacy?
THE RED SEAL PLAN for Adequate House Wiring
ELECTRIC HOME
ELECTRICAL LEAGUE OF COLORADO
DENVER, COLO.

Red Seal

Recent advertisements placed in builders' publications and in newspapers in Colorado to acquaint the public with the Red Seal Plan.

Advertising

Contractors of Denver co-operate to place the Red Seal idea before their customers, the home builders and the home buying public.

Aside from This an Estimator Has Nothing to Do

[Being the official declaration of the qualifications for a first class estimator as set forth by the Estimators Section of the California Electragists, Southern Division, and held up as an ideal by that group.]

1. An estimator must know most of the standard types of electrical fiettings and materials used in electrical construction and repair work, including overhead and underground, inside and outside construction and design of switchboards.

2. Must have a thorough knowledge of the amount of labor required to prepare these materials for installation and how to install them in any type of building or structure under any condition of soil or difficulty of topography.

3. Requires the ability to advise customers of the best type of new apparatus to meet their particular operating conditions from a standpoint of first cost, economy of operation, durability, future expansion or future obsolescence of equipment.

4. Must have the ability to redesign customer's old equipment to meet new, or more desirable, operating conditions, including practicability of changing from one voltage or speed to another voltage or speed; also to figure speed, size and horsepower of shafting, belting, pulleys and gears, and to specify proper type of hangers, bearings and other necessary equipment.

5. Must know how to design foundations for electrical and mechanical equipment, specifying proper mixtures for concrete, correct sizes and length of foundation bolts, correct sizes for steel or timber supports, and to superintend the erection or placing of the equipment upon these supports.

6. Should have the ability to visualize the "completed job" and each step pertaining thereto and the accomplishment of these progressive steps in the most economical and efficient manner; also the ability to transmit this knowledge to his men in such form as to be easily grasped, both by means of drawings and verbal instruction.

7. Must have a capacity for appraisal and valuation of materials and equipment for inventory or resale purposes, or for adjustment value of damage due to any cause.

Electric Heat in Various Industrial Applications

Methods of Applying Heat Elements to Peculiar Conditions Are Considered in this Sixth Article on Electric Heat

By J. R. WILSON,* Quality Electric Works, Los Angeles

Electrical Estimating Series XXV

CONTINUING our study of the uses of electric heat a number of further applications may be considered.

Rivet Heaters

Probably very few estimators give thought to the possibilities presented by the "unusual" type of electric heating applications. In this category may be mentioned rivet heating machines, as they seldom are seen in the ordinary industrial plant. This is due to the fact that very few users of rivets are conversant with the economies to be effected by use of these machines.

There are several types of these machines now on the market, and many advantages over other methods of rivet heating are claimed by the manufacturers. In the ordinary forge much spoilage results from improper heating due to lack of heat control. With the electric forge this spoilage is completely eliminated. These electric forges are semi-portable and do not develop objectionable gases or fumes. This feature alone is a decided advantage as the forge may be placed directly adjacent to the work. This makes for economy of labor in the handling and placing of the rivets.

While each manufacturer of forges of course has his own design, the machines all fall within the class of welding apparatus. Most of the machines are designed along the lines of butt welders, the rivets closing the gap in the secondary circuit of the transformer. The passage of a high current thru the secondary circuit heats the rivet to a white heat, the same as though it were heated in the usual type of coal fuel forge. The claim is made that electrically heated rivets, being heated from the core outward, will hold their heat longer than those heated by other means.

The high current necessary in the secondary circuit of electric rivet heaters is produced by designing the primary circuit of the transformers with a large number of turns, the secondary circuit being composed of one or more turns of heavy bar copper. By inserting the rivet in the terminals, which form a gap in the secondary circuit, the secondary circuit is completed and the current then passes through the rivet. In those types employing only a single turn secondary, the heavy copper bar is formed around the transformer core, the rivet completing the circuit in the usual way. Some of these machines have a current consumption of 20 kw. per 100 lbs. of rivets.

Rivet heaters have so many possible applications in industry that it will well repay the electrical estimator to canvass the field in his locality. For a complete knowledge of the different types of machines available, the reader is referred to the following manufacturers:

Humie Corporation, New York, N. Y.
Champion Blower & Forge Company, Lancaster, Pa.
American Car & Foundry Company, St. Louis, Mo.
National Equipment Company, Springfield, Mass.
Thordarson Electric Manufacturing Company, Chicago, Ill.
Winfield Welder Company, Warren, Ohio.

Water Heating—Boilers and Kettles

The heating of water electrically employs many types of apparatus, some of the most common forms being boilers and kettles. In the field of application to boilers alone several different classes of use have been developed. In the smaller sizes these boilers are classed as water heaters and are used in homes, restaurants, small clubs, etc. These sizes usually employ heating coils, the coils being immersed in the water in some cases, while others employ a flexible unit which is wrapped around the tank or boiler.

The water container is usually provided with a heat-insulating covering which serves to retain the heat in the water, thereby reducing the current consumption. Most types of heating units are provided with two and three-heat switches, the initial heating making use of the total unit capacity, and reduced current being used after the

* All rights reserved by the author.

water has reached a predetermined temperature. Thermostats and contact-making thermometers also are employed in some cases to make regulation entirely automatic.

Many of the large types of boilers are used for the generation of steam. In the usual type the water is heated by passing the current between electrodes immersed in the water, as in a water rheostat. The types and designs of these boilers cover a wide range and operate on voltages of 220 volts to 22,000 volts, with current consumption of 1,000 kw. to 50,000 kw. Such boilers are operated on single, two and three-phase current, the three-phase type usually employing single tanks per phase, with the three tanks feeding into a common steam header. A 100 hp. boiler would have a current consumption of 1,000 kw., and an efficiency of about 97 per cent.

Use for these large boilers is found in many places. Industrial plants which are located close to large hydroelectric plants and require steam in their manufacturing processes usually find the use of electrically heated boilers to be more economical than any of the fuel heated types. This is particularly true of pulp mills and electro-chemical works. In isolated locations, where the transportation of fuel is usually prohibitive, the use of electro-steam boilers serves to solve the problem in a very practical manner. This also applies to cases where it is desired to use steam in sections of a large manufacturing plant somewhat remote from the main boiler equipment. By use of these electric boilers expensive installations of piping from the main boilers are entirely eliminated. This scheme also has the added advantage of operation of the units independent of the main boiler plant.

The use of electric kettles in manufacturing plants is becoming more common each year. A great many cooking processes depend upon maintenance of absolutely critical temperatures over a prolonged period of time. Any deviation from these predetermined temperatures may result in spoilage of materials representing a considerable amount of money. Where these conditions exist electric kettles are finding a wide application. The combination of electric heat and automatic control affords a means of carrying on such cooking processes along lines that yield absolutely uniform results.

While there are many designs of kettles the usual type of heating system employed consists of a heating unit placed in the bottom of the kettle with a heat deflector of insulating material placed beneath the unit. This directs the heat upward, placing it where the maximum effect will be obtained. The use of such kettles eliminates all flame and gases, thereby reducing fire hazards (due to kettle boiling over) and contamination of food products.

Sterilizing kettles of capacities of 1,000 gal. per hour are not uncommon. Electrically heated pitch and compound kettles also find an extended use, due to lack of fire hazard, where highly inflammable materials are to be melted.

Water Baths

Watter baths are commonly defined as double boilers, where an inner vessel (containing the material to be melted) is surrounded by water in an outer container. This type of equipment is extensively used in industrial plants for melting or warming glue, putty, varnishes, shellac, compounds, etc. Water baths are usually heated by means of a heating element immersed in the water of the outer container, or attached to the bottom of it. Heat regulation is provided by means of a two or three-point heat switch.

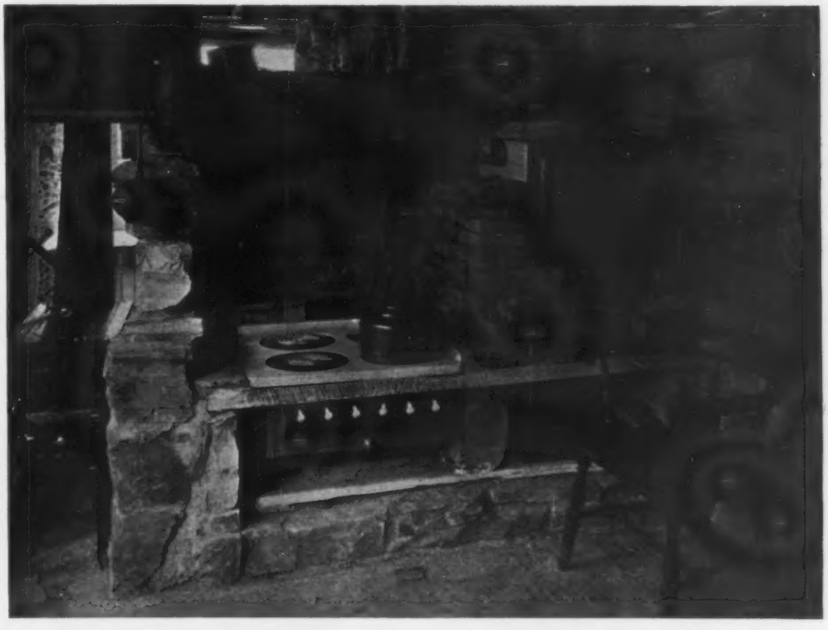
Water baths are used also to a large extent in laboratories for evaporating liquids or for maintaining solutions or cultures at constant temperatures not exceeding 212 deg. F. Usually the solution to be heated is placed in a test tube and suspended in the water bath. This type of water bath usually employs an immersion type of heating unit, a heater switch and a thermostat for maintaining constant temperatures. Among the many kinds of materials tested in such evaporators are gelatine, potash, sugar, glue, acids and extracts.

In the use of glue for industrial purposes even temperature of the glue is essential to produce uniform results in veneering and joining of woods and other materials. The desired results can be attained much more easily by the use of electric heat than by other forms of fuel heating. This is true because electric heat is not subject to variations of pressure and the heating can be automatically maintained at desired temperatures. Two types of glue heaters are in general use: the dry type, without a water jacket, and those which make use of a water jacket and can be classed as water baths. In the dry type dependence is placed upon the heating unit making continuous contact with the bottom of the aluminum or copper glue container. A lower dead-air space radiates the heat upward to the bottom of the container. The water bath type has been previously described. Both types are made in various sizes, requiring from 60 to 650 watts.

Complete lines of boilers, kettles and water baths, for the uses noted herein, can be supplied by the manufacturers listed below:

Cramer & Company, New York, N. Y.
J. Struthers Dunn, Philadelphia, Pa.
Automatic Electric Heater Company, Warren, Ohio.
Electric Sales Service Company, San Francisco, Calif.
Prometheus Electric Corporation, New York, N. Y.
Arthur Fowler Company, Spokane, Wash.
General Furnace Company, Leetsdale, Pa.
Electric Boiler Corporation, Cambridge, Mass.
Barth & Son, New York, N. Y.
Ohio Electric Heating, Cleveland, Ohio.
Rohme Electric Company, Minneapolis, Minn.
Presto Electric Company, San Francisco, Calif.

Unique Electric Range Installation



How the electric range, the most up to date servant of modern times, may be adapted effectively into the native type of Spanish house, was effectively demonstrated recently in the home of J. M. Mendell on the Monterey Peninsula. Frederick H. Reimers, Oakland architect, designed both the home and the method of employing the range.

"As to the motive of installation, when you are building a Spanish house very largely of native material such as logs, stones, adobe, brick, locally hand-split shakes, etc., the natural tendency is to carry the same idea into the kitchen. I guess that's all there is to it."

However, as the illustration shows there is more to it than just that. An artistic result is achieved at the same time that all effective parts of a modern mechanism are maintained.

Better Merchandising

Building up Electric Sales in Arizona

How a Merchandising Program and Sales Plan Boosted the Annual Kilowatt-hour Consumption Twenty Per Cent Since 1921

IN a year's campaign, conducted throughout 1926 by A. F. Morairty, sales manager of the Central Arizona Light & Power Company, Phoenix, two things were accomplished with marked success: the use of light on and about the power company building demonstrated the value of this medium of advertising in actual practice, and the community of the Salt River Valley was awakened to an "electrical consciousness."

The indirect advertising, that is for the sale of electric equipment for the home, has produced a 30 per cent direct increase in the use of electricity as measured in actual kilowatts per customer.

Here is an outstanding example of advertising applied to subsidiary equipment in order to sell a utility. The actual sales of equipment amounted to $155,000, no small matter in itself. But the sale of electricity, a "continuous flow of merchandise," amounts to a business that will run into much greater figures.

Direct advertising would never have secured this business. You can't go out and sell electricity. The idea of indirect advertising is summed up in the fundamental principle laid down by Mr. Morairty: "Every move in the campaign must be a move to secure electric outlets."

"Make Your Stage Setting"

As his first lieutenant Mr. Morairty chose his publicity man, Jack Arnold. Beginning at headquarters, the plan was to interest the public in an unusual showroom display of electric accessories, and Mr. Arnold opened fire with a Christmas window showing in December, 1925, which made a distinct impression on the public. Throughout the year the interest in this display was never allowed to lag, and out of a series of experiments carried on continuously, Mr. Morairty drew this conclusion: "Action on the floor is the first essential of office publicity. When you have a waffle iron to sell, demonstrate its use by serving waffles. Work out a plan of making an effective stage setting for your demonstration; interest your public first, then focus attention on the details of your specialty."

Several things stand out as unusual in the merchandising policy of the Central Arizona Light & Power Company. Among them are that the sales force was built up of operating men, trained to selling; that the sales floor is kept "alive" by means of some type of demonstration at all times; that prices are never cut; and that extensive results have been obtained in getting real estate men to put on and advertise "electrical subdivisions."

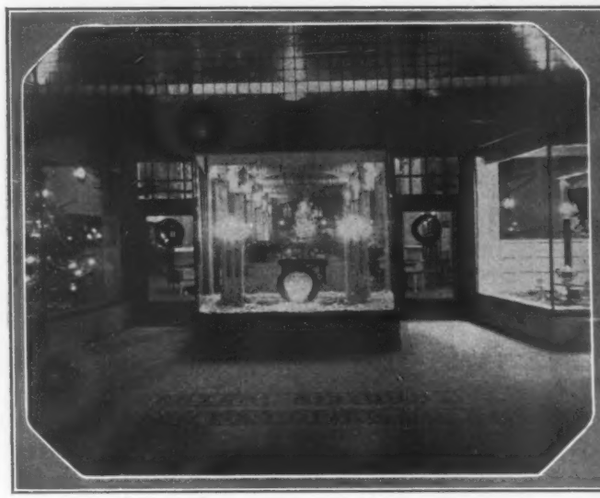
Having something of this sort in view, a young woman was chosen for her ability to visualize business properly, and she and Mr. Arnold centered their attention on keeping up the local interest at headquarters.

Recruiting an Operating Sales Force

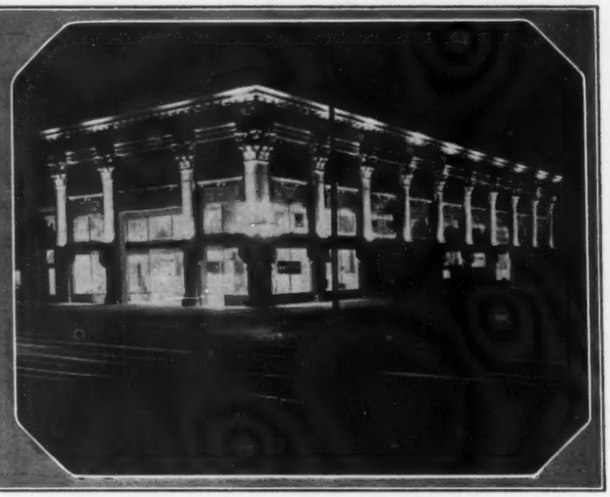
The sales force was built up from the operating department, and with but one exception the salesmen were men of experience in line work, trained to do the particular selling job the company had before it.

At the outset, the general plan was presented to the prospective salesmen. It was explained that the company was going out for more electric business, and that the means to this end would be the installation of electric outlets based on the sale of accessories. The men were made to see that they were part of a big extension push, and not merely house to house canvassers for curling irons.

Up to the beginning of this campaign the company had been selling "line extension"; they now began to center



The store front of the company presented an unusually brilliant scene at the Christmas opening.



Decorative floodlighting sets off the power company building and advertises its services in lighting.

their efforts on the selling of current consuming devices.

The salesmen were given a direct demonstration of the old plan as compared with what was hoped for from the new. For instance, the policy of the company in regard to extensions had been to expend $2 for each dollar of revenue received from lines inside the city, and to expend $1 in lines for each dollar of revenue received outside the city. A light customer averaged $15 a year; therefore $15 per customer had been the basis of the old extension policy outside the city, and $30 inside.

Load Building with Line Building

Now, it was proposed that the annual revenues for appliances would be on some such schedule as the following:

Electric ranges	$80
Electric water heaters	50
Electric refrigerators	41

It was an easy matter to show a salesman who had spent years in the company's operating department that the aggregate proposed here was something worth working for. He was in a position to grasp the whole campaign intelligently from the first. These salesmen were sent to the new prospects with the offer of immediate installation of such heavy duty appliances, to be paid for on a deferred payment plan by which the customer would get the immediate conveniences, and the company would get $100 per customer instead of $15, as before.

The general proposition was laid down that the salesman must sell the customer before the line was put in. The men were kept on their old salaries and given a commission on sales of appliances.

These trained men were then sent out with instructions to carry on a three-fold campaign with the utmost intensity:

1. To operate the contract department in such a way as to gain good will increasingly. To this end, customers were not to be kept waiting for anything, extra help being called in wherever necessary. This provided for the proposed increase in the force.

2. To wire all unwired houses along the old lines.

3. To investigate all prospects for extensions, going directly to the customers.

One of the real estate advertisements drawing attention to the electrical features available in the homes in its tract.

It was proposed to carry on this intensive campaign for new business for three months, while the interest in appliances was being worked up from headquarters. Within the first four weeks the results were apparent. The public was ready.

The direct reaction of the public to newspaper advertising may be illustrated by the offer of $1.05 for any old-fashioned iron in exchange on a new Edison electric. The single insertion of the advertisement brought 80 sales over the counter.

Right then was laid down the principle never to sell anything at a cut price, and never to give prizes. The advertising has more and more tended to boost the lines handled by other dealers in electrical devices, the main idea being to get and hold the good will of the community and at the same time get more outlets for current.

Making Electrical Subdivisions

The biggest showing of all has been made in connection with live real estate dealers who have joined the company in a special campaign, advertising homes electrically equipped in every particular.

Four such subdivisions have been opened in Phoenix during the past year in connection with Mr. Moriarty's campaign and all have been brought to a high point of success, mainly by the publicity obtained through a special section taken in the Sunday paper on the big day. A demonstration of electric

FOLLOW THE HOTPOINT MAN
TO THE
"Del Rey Home Electrical"
He Is On Duty There Every Evening Of The Sale Demonstration
The All White Super Automatic
Hot Point Electric Range
This Electric Range—The Heart of the Kitchen—truly gives an entirely new atmosphere. It creates a place to generate heat for the cooking of better foods—flour in appearance and better in taste. It is convenient, cool, clean, efficient and economical.
This super-electrical chef will prepare your food automatically while you are motoring along a "See Arizona First" trail and will deliver to you a well cooked meal upon your arrival home about 6 P. M. Sunday.
Demonstrated at "Home Electrical" Every Evening During Sale
SERVEL
"The Ideal Electric Refrigeration"
Servel, Guardian of Health, Has Popularized Electrical Refrigeration in Phoenix. It operates quietly, efficiently and economically.
Demonstrated at "Home Electrical" Every Evening During Sale
ONE MINUTE
Electric Washer
Only the One Minute Brings You These Notable Improvements
The ALL COPPER TUB is not affected by alkaline water
THE THOR
Folding Ironer
ONE MINUTE Electric Washer
The Thor-30
FOLDING ELECTRIC IRONER
Demonstrated at "Home Electrical" Every Evening During Sale
Calapco
Central Arizona Light And Power Co.
Demonstrated at "Home Electrical" Every Evening During Sale

A section of the paper was virtually converted into an electrical section by means of the power company's double page spread, other electrical advertisers taking advantage of the situation to place their displays adjacent to it.

devices with a breakfast or luncheon service free is arranged in one of the homes, and the event is covered in this special Sunday feature section, comprising from 16 to 24 pages of high pressure publicity.

Of course the cost of such advertising is shared by those benefiting. The fact is that the light and power company actually paid for an exceedingly small part of this space, except in the service of Mr. Morairty and his assistants in preparing copy.

Other Feature Advertising

Cooking schools, parades, fair exhibits, and close co-operation with the industrial congress and other local organizations in all community publicity served throughout the year to bring about the consciousness of the entire community to the service that was being offered them in things electrical.

The net result in volume of business, dollars and cents, and percentage gains can be seen at a glance from the following table covering the years 1921-24 when no special efforts were being made in merchandising, as compared to the years 1925-26, when the campaign was on.

The first three months of 1927, as compared with the same three of 1926, show that the growth continues and that it may be counted on as a steady and permanent thing.

Central Arizona Light & Power Company Analysis of Total Residential Electric Sales of Kw-hr. Twelve Months Ended December 31, 1921 to 1926, Inclusive.

	Total Residence Revenue	Total Kw-hr. Sold	Average Number Consumers	Average Revenue Per kw-hr. In cents	Average Annual Revenue Per Consumer	Average Annual Kw-hr. Per Consumer	
1921	156,512.82	2,020,549	6,806	7.74	$23.00	297	No Merchandising.
1922	160,903.19	2,092,309	6,950	7.69	23.15	301	
1923	165,872.31	2,133,655	7,494	7.77	22.13	285	
1924	191,631.18	2,510,088	8,292	7.63	23.11	303	
1925	219,471.83	2,896,306	9,034	7.58	24.29	321	Merchandising.
1926	266,539.28	3,585,094	10,010	7.43	26.63	358	
Increase 1926 over 1921	110,026.46	1,564,545	3,204	Decrease .34	3.63	61	
% Increase 1926 1921 over	70.3	77.4	47.1	4.4	15.8	20.5	

	1926	1927	Gain
January	39	50	11
February	33	41	8
March	32	41	9
Gain in three months			28

Westinghouse Merchandising Executives Hold Exhibit

Following an afternoon of exhibits, a sales conference and dinner was held at the Palace Hotel in San Francisco, Friday, June 3, 1927, by representatives of the merchandising department of the Westinghouse Electric & Manufacturing Company.

The exhibits were individually in charge of department managers as follows: W. G. Balph, manager, safety switch section, Mansfield, Ohio; P. Y. Danley, manager, interior lighting section, South Bend, Ind.; R. E. Imhoff, manager, appliance section, Mansfield, Ohio; E. W. Knight, manager, fan motor section, Springfield, Mass.; Reese Mills, manager range section, Mansfield, Ohio.

At the dinner, Friday evening, George Baily, assistant manager, merchandising department, Mansfield, Ohio, was the feature speaker. He was introduced by Harry Garbutt, manager merchandising division, San Francisco. B. F. Manuel, Fobes Supply Company, San Francisco, gave a short talk, representing the jobber interests. The individual department managers were then introduced, following which John Clark, manager of the promotion department, Mansfield, Ohio, gave a short talk on the new advertising policy of the Westinghouse company, employing newspaper advertising exclusively for general advertising purposes.

J. S. Tritle, general manager of the merchandising department, Mansfield, Ohio, was the principal speaker at a meeting of the San Francisco Electrical Development League June 6. He was introduced by Carl Heise, district manager, San Francisco. Mr. Tritle spoke on the general merchandising trends of the present, defining the place of each branch of the industry in the present selling policy of his organization.

Lamp Display Shows Evolution of Lighting

An interesting lamp window which included a display showing the evolution of lighting was used by a large San Francisco store recently. The various lights used in showing the evolution of lighting from the first light to the present Westinghouse Mazda lights were arranged in black boxes which were placed along the front of the window. The background consisted of a gathered drop curtain made of black oil cloth which was very effective in bringing out the display to the best advantage. In the background were a number of floor lamps while in the center front section of the window there was a pile of the new type of Mazdas arranged on the floor.

One-Man Show of Jobber Tells How to Sell Appliances

An effective sales demonstration and lecture has been given throughout the Pacific Coast territory recently to groups of contractor-dealers by J. A. Smith, representing The Electric Corporation.

Mr. Smith puts on what might be termed a "one-man show" in which he cleverly introduces the numerous appliances of the Universal line and describes the best methods for promoting and selling these appliances.

Each appliance is taken in turn, its features analyzed and the best sales features of it brought out in a way which can be imitated to good effect by the individual dealer. Mr. Smith is very witty in his presentation and his selling information is cleverly arranged.

In some sections of the territory covered the lecture has been booked for a number of return engagements at which increasingly larger crowds are in attendance. In each locality the district representative of The Electric Corporation makes the preparatory plans for the show and acts as host to the group of dealers and power company representatives who came to the meeting. The traveling show is described as a very successful sales booster for this line of appliances.

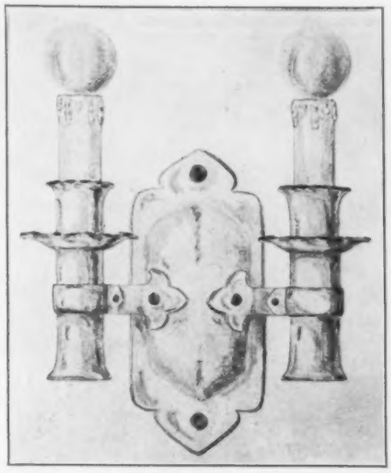
Designing Fixtures—A Labor of Love

Fitting Fixture Design to Home Atmosphere Accomplished by J. C. Hobrecht as Special Service

Design for bracket to be used at the doorway of a high class residence in Sacramento.

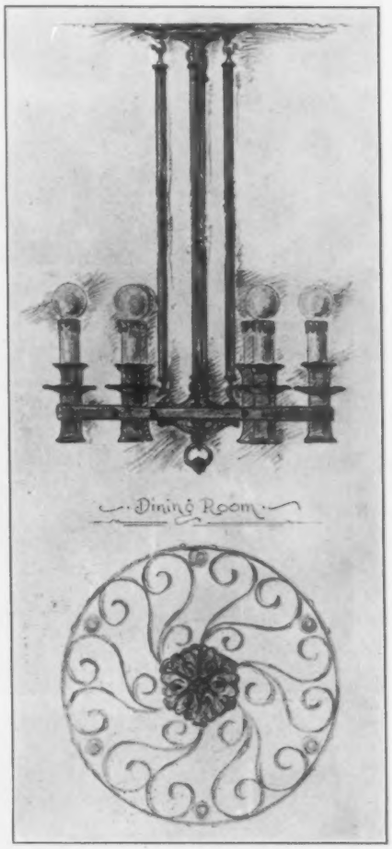
WHEN Joe Hobrecht started in the electrical business, it was a special hobby of his to design lighting fixtures. Possessed of considerable artistic talent and an ability to draw well, he spent hours in the little studio office he had on the Mezzanine floor of his Sacramento store, designing special fixtures for the homes that were being built in Sacramento at that day.

Then came the influx of cheap fixtures and competition on a price basis which made it impossible to devote time to the designing of fixtures if they were to be sold even at cost. Mr. Hobrecht laid aside his drawing instruments and his paints and set aside his drawing board to devote all of his energies to the active merchandising of appliances.



A heavy bracket of cast and hammered metal.

Fixture for a stair well. Note the detail of the bottom of the fixture, which may be seen from the foot of the stairs.



A dining-room fixture in which the design of the bottom of the fixture, seen from the table, has been given careful thought.

Not long ago the owner of a large home being built in Sacramento, knowing of Mr. Hobrecht's talent, requested him to design special fixtures for his home. The familiar drawing tools came back into Mr. Hobrecht's hands joyfully and he set about to create again rather than to compete.

The designing of fixtures has again become Mr. Hobrecht's private hobby. He is designing them, however, only on special order and never on a competitive basis. Invariably he makes a study of the home in which they are to go, its decorative scheme and its furniture, and then designs the fixtures to express the character of that home. A few samples of some recent designs are reproduced on this page.

The manufacture of the fixtures, involving casting and hammered metal work, is done in the Hobrecht shops in connection with the store. The fixtures for the Sacramento Memorial Auditorium were built in these shops.

Coronado

Interior Coronado

La Jolla

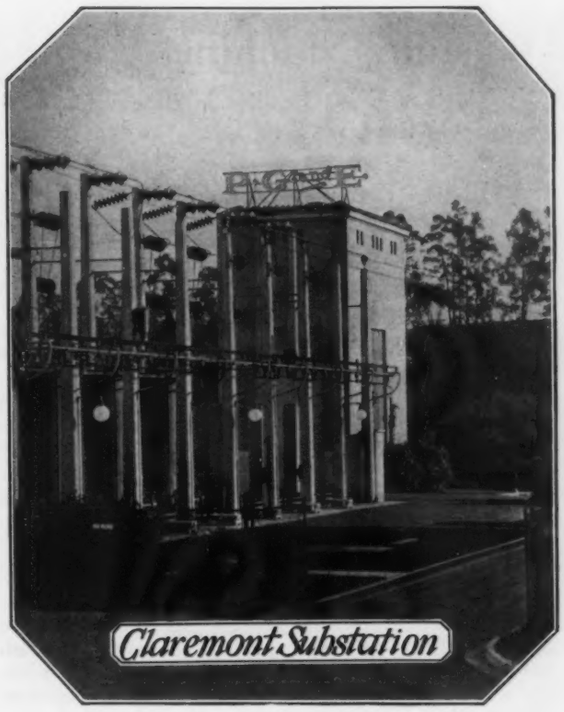
La Mesa

Byllesby Merchandising Starts in San Diego County

THE San Diego Consolidated Gas & Electric Company celebrated its entrance into the field of general merchandising by opening five stores in its district offices in San Diego County, Calif., during the week of May 23. Showcases in these stores were manufactured in San Diego and are of walnut finish in standard Byllesby design. Display tables are equipped with convenience outlets for demonstrating the various electrical appliances to customers. The company spent several weeks preparing for the formal opening of the stores. Invitations were mailed to customers in each district and local newspaper advertising called attention to the event. Open house was held from 1 p.m. until 9 at night, girl employees of the company acting as hostesses. Each visitor was given a numbered card which served as a chance on an electrical appliance. Leading manufacturers gave demonstrations of labor-saving equipment, electric sewing machines, washers and ironers creating the greatest interest. J. W. Devereaux of the Byllesby Engineering and Management Corporation came from Chicago to be present at the initiation in each community.

Escondido

Oceanside



Practicing What We Preach

By J. CHARLES JORDAN, Manager Publicity Department, Pacific Gas and Electric Company

THE power company without an electric sign might be likened to the carpenter without a hammer. It lacks one of the vehicles necessary to hit the nail on the head and drive home the clinching argument for others to use signs.

Many salesmen in selling space for newspapers and other periodicals, endeavoring to put over a campaign, come first to the electric company for an advertisement. If successful, they use that electric company advertisement as a basic argument in their selling effort, stressing the point in talking to prospects that if it is good business for the "so-and-so" electric company, it is good business for you to advertise in this publication.

If the power company hopes to sell energy through electric signs it should be one of the first to lead the way. Others will follow. As an interesting example I might cite a case in a small town in this company's territory where a grocer purchased and installed an electric sign. It came to the attention of the company's agent that the grocer had let this sign deteriorate with broken glass and burnt out lamps, resulting in the sign being non-operative. The agent endeavored to get the merchant to recondition the sign and put it in operation but his efforts were of no avail. Recently the company installed one of its standard signs. The grocer, within ten days had repaired his sign, installed new lamps and put it in operation. Salesmen endeavoring to sell electric signs have the wind taken out of the sale when a prospect comes back saying, "Why don't your own people install electric signs?" The result is that a sales resistance is thrown up which is difficult for the salesman to overcome.

The Pacific Gas and Electric Company had long felt the need for a standard electric sign. In the establishment of a standard many factors had to be considered. Large sums of money had been spent in advertising and establishing the company's emblem, the standard trade-mark, "P. G. and E," and the slogan, "Pacific Service." These were well established in the public mind and had to be considered in the designing of an electric sign to be used throughout the company's system.

The publicity department, fully realizing the need of a standard, assumed the responsibility of a design which would be attractive, effective, and include the features so prominently displayed in the company advertising. These features were used in newspaper advertisements, trench barriers, window displays, painted signs, and many miscellaneous uses, and it would have been a mistake to omit them. After making up many designs, a standard was arrived at which has met with almost universal approval as being an attractive, distinctive, and effective advertisement for the company. One of these signs is now installed on nearly every P. G. and E. office. Eventually all offices will be equipped and properly identified.

On the smaller, or agency office signs, "P. G. and E." only is illuminated while the top and bottom panel are all enamel.

Utah Does It Again—In Washing Machines

Sixth Annual Washer Campaign Excites Greater Sales Rivalry and Results in Sales of 1,367 Machines to Territory Highly Saturated with This Appliance

AN EVENT of outstanding importance in the field of electrical merchandising was the annual March washing machine campaign of the Utah Power & Light Company. In the face of unprecedented competition and a greater degree of saturation than ever before, this institution stepped out and sold 1,367 washing machines during the month of March this year—a figure second only to its own high record of 1,711 machines established during March, 1920.

The same spirit of genuine enthusiasm and determination that has prevailed in previous similar campaigns among the members of this company's organization, was in evidence more than ever before—a condition which is undoubtedly a real factor in the success of such an undertaking as exceeding a quota of 1,000 machines by a margin of nearly 400.

For the sixth successive time the famous slogan, "A Copper Washer for a Silver Dollar," was used again. This slogan seems to play a very important part in immediately identifying in the public mind this great annual event, and it would be safe to say that there is hardly a man, woman or child in the company's territory, possessed of average intelligence, who does not know what it means as soon as it is announced.

The plan of campaign was, generally speaking, the same as in previous years, with, of course, a number of new ideas to stimulate intense sales effort being introduced. One of the "stunts" which created an immense amount of interest among the company's sales force was the use of a punch board in each of the ten divisions. Corks were inserted in the holes in each board, and for every sale the salesman was allowed to pull a cork and possibly win a prize, in accordance with the number or notation he drew. In addition to the prize money on the punch boards, a bonus system was in effect, the bonus money being distributed to the divisions on the basis of excess over quota. This money was in turn distributed by each division manager among the employees in his division participating in the campaign, in proportion to their sales.

Planning for a Bang-Up Summer

Why let the hot weather interfere with summer selling? It is an excellent sales argument for many lines—and the very fact that the other fellow is loafing on his job from heat exhaustion gives you a head start. At least, so says Norman Olson, sales manager of the Maytag Company of California to his salesmen. Along about June last year he sent them a letter warning them that he expected their July report to go off with a "bang." The fourth of July brought a large-sized extra giant firecracker in the form of a red mailing tube with cap and fuse at one end. Inside was a second communication and a suggestion for making summer sales a rapid fire proposition. With excellent psychology, the salesman was urged to keep the giant cracker in his pocket when making calls. "See what the firm sent me for the fourth?" makes an excellent topic for discussion. "I am supposed to fill it with orders and send it back. I have five already. Can't I close this deal with you and make it a sixth?" More than one name on the dotted line resulted from this stunt, with extra rewards in the form of a bonus to the salesmen sending them in.

Newspaper display was the basis for most of the advertising. Direct-mail broadsides were also sent out just prior to the beginning of the campaign. A large amount of attention was also centered on store and window displays, animated characters in the windows being used to good advantage during a part of the time.

Participation in the campaign by employees other than those of the sales force was made possible by the payment of $2 in cash to each employee for each prospect turned in to which a sale was made. This resulted in considerable interest outside of the regular sales organization and a number of sales were closed by this method.

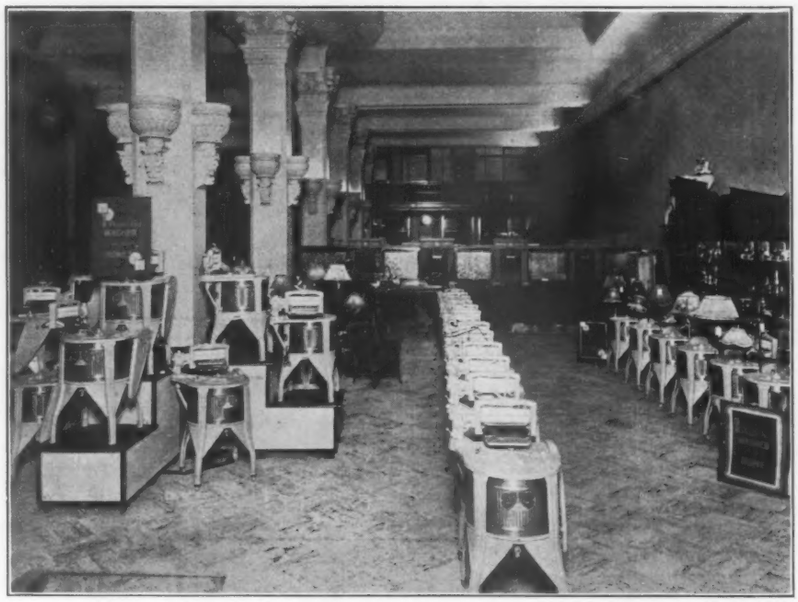
A spirit of intense but good natured rivalry existed among the various divisions, interest being centered on which one would reach its quota first, and then a race developed as to which would exceed its quota by the greatest percentage. The honor of reaching quota first went to the company's Idaho Falls division, and in this connection mention should be made of the enterprise and enthusiasm shown by this division in the publication of its own daily bulletin, "The Cork Screw." This little publication was a masterpiece of wit and proved to be a wonderful source of stimulation for sales effort on the part of employees in that section of the company's territory. The western Colorado division exceeded its quota by the greatest percentage.

Interest of the entire sales organization was maintained at a high pitch throughout the campaign by means of peppy meetings. Daily sales letters were sent out by the general sales department announcing the results, by divisions, of each day's activities, and containing messages of encouragement. These also resulted in instilling much "pep" into the sales people.

The quota of 1,000 machines was apportioned among the company's ten divisions according to the number of customers in each division.

Terms of $1 down and $5 a month were again in effect.

As examples of what can be accomplished by intensive sales effort, backed by the "Never Say Die" spirit one hundred per cent, the annual March washer campaigns of the Utah Power & Light Company for the past several years have attracted nation-wide attention, and its most recent achievement—the selling of 1,367 machines in one month—is to be considered truly remarkable.



Part of the washer display on the floor of the main office during the annual March washer campaign.

A Light Color-Scheme For the Electrical Store

Its Advantages Over Dark Trim Are Its Association with "Light" and Its Harmony with Modern Home Decoration

THE color scheme in the sales room of the Whitney Electric Company, Colorado Springs, Colo., is French gray and ivory—very light colors for any sort of merchandising establishment. Some authorities might take the position that electrical equipment and appliances, being of polished nickle and brass, for the most part, should be displayed in a room wherein the color scheme was dark, in order to accentuate the brilliancy of the appliances.

Evidently Matt Whitney thinks otherwise, and his color scheme of exceptional light colors has advantages not contained in color schemes commonly used.

While it is true that the present day dealer in electrical supplies, equipment and appliances handles many articles that are not light or illumination producers, still the world continues to subconsciously associate electricity with light. When you mention "electric shop" to the average man or woman, he or she immediately thinks of a place where you can buy electric light globes or light fixtures. "Isn't it quite probable that light colored decorations would serve to accentuate the thought of light?" asks Mr. Whitney.

A second reason for such a color scheme is one of sanitation. White woodwork and white walls show the dirt readily—there is no putting off the clean-up jobs until tomorrow on the supposition that customers will not suspect that the woodwork isn't clean. Hence washing woodwork is a frequent task in this shop and the place always looks spic and span.

Many of the electrical appliances—electric ranges, washing machines, refrigerators—are associated with ultra-clean kitchens. Indeed, the cleanliness of such appliances compared with the old time refrigerator, washtubs and cook stoves is a selling argument. The light colored, sanitary appearance of Whitney's store bear out this idea. The housewife automatically pictures a white enameled electric range in a spotlessly white kitchen—her kitchen.

The accompanying photograph gives some idea of the bright cheerfulness of the Whitney store. It is quite probable that the beauty of electrical equipment and appliances as depicted in their polished metal is just as strongly presented against this cheerful white background as it would be against a background of mahogany or oak. In addition to this, there is the further advantage in the fact that many of the homes are now being finished in light colors—in fact light colors in woodwork and walls are the style, and any woman, seeking new electric light fixtures, may get a better conception of how they will look in her new or newly decorated home when she sees them displayed against a similar background in this shop.

The photograph also shows some of the features of the display room, other than the color scheme. The semi-booths will be noted in which some of the fixtures are shown. See how the ceiling is dropped—a solid panel, if you please—to the average height of a modern living room. Also note how the booths, if one may call them such, are largely suggested by a narrow drop panel at the top, a narrow strip at the rear and a sort of ballustrade from the floor upward about three feet.

One of the objections to the average display room is that of the heat occasioned by several fixtures burning at once when they are being displayed and compared. Such a condition need not exist here because the high ceiling in the remainder of the sales room takes care of the surplus heat from the display of fixtures. In fact the customer need not stand under the lowered ceiling, but may stand anywhere else in the main sales room and discern the characteristics of this and that light fixture.

There is no putting off the clean-up day when the store is in light color. It must be kept spic and span, as is the store of the Whitney Electric Company, at Colorado Springs.

Range and Water Heater Drive in San Diego County

An intensive sixty-day range and water heater campaign was opened in San Diego County on May 9th by the Westinghouse Electric & Manufacturing Company and the Everhot Electric Water Heater Company. Demonstrations in the form of cooking lessons were given in eighteen towns and villages by Milton Henoch of the Westinghouse company. Sufficient time was allotted in each location so that all prospects could be thoroughly covered by follow-up calls.

Both companies offered to pay a bonus to any employee of the San Diego Consolidated Gas & Electric Company who succeeded either in bringing in a bona fide prospect or a closed sale.

A feature of the range campaign was the reduction of the first payment. During the campaign extra inducements were made in the way of a premium with each range sold, the premium being the choice of a clover-leaf set, aluminum cooking dish, glass casserole or an electric fireless cooker.

As the opening gun of the campaign a dinner was given on April 20 at the Cabrillo Cafe for all those who took part in the campaign. An outline of the range sales plan was given by A. E. Holloway, superintendent commercial department, San Diego Consolidated Gas & Electric Company; a range sales talk was given by Milton Henoch, followed by a talk on water heater sales by Harry Fogwell of the Everhot company.

News of the Industry

Left—Baker River dam of the Puget Sound Power & Light Company, showing new piers erected on top of the new spill crest, which is at El. 423. Above—Looking down stream from the top of the dam. A portion of the town of Concrete, Wash., may be seen in the distance, and above it on the bluff the construction camp of Stone & Webster, Inc., builders of the development.

Baker Dam Raised 30 Ft. Adds 60,000 Acre-ft. Storage.

To provide for the additional storage of 60,000 acre-ft. of water and for the generation of 8,000 hp. additional by the present installed equipment at the Baker River development of the Puget Sound Power & Light Company, the division of construction and engineering, Stone & Webster, Inc., is raising the level of the Baker dam 30 ft. The original dam, with a height from bedrock to the top of the floodgate piers of 263 ft., on completion of the work this summer will have a height of 293 ft., establishing a new record for the height of power dams in western Washington.

By raising the head on the wheels from 225 ft. to a maximum of 255 ft. the capacity of the plant will be increased from around 42,000 hp. to nearly 50,000 hp., and the characteristics of the flow of the stream are such that the added 8,000 hp. can be made available during a large portion of the year. More important, however, to the needs of the company's power system is the provision for additional water storage, which increases the usable water in the Baker reservoir to a total of 130,000 acre-ft. The additional 60,000 acre-ft. will generate approximately 12,000,000 kw-hr., which will be used during the two low-water periods of the river occurring in the early fall before the winter rains set in and in the middle of winter when freezing temperatures reduce the flow of the stream. This additional available output is expected to reduce the necessity of steam generation to a minimum.

The normal spill crest of the original dam was at El. 393, but an additional 12 ft. of regulation was provided for by gates, 10 ft. wide and 12 ft. high, between concrete piers 29 ft. high imposed on top of the dam across its length. These gates were operated open during conditions of flood in the river, but permitted raising the elevation of the reservoir to El. 405 under conditions of normal flow. The dam was so designed that at any time it was deemed advisable its height could be increased by the comparatively simple expedient of filling solid masonry between the piers and erecting a similar set of piers to carry floodgates on the new crest thus established.

It was decided to start this improvement in February of this year in an endeavor to obtain the additional storage by this year's low-water period in the fall. It was hoped that the spring flood would be delayed long enough to permit of the completion of the first stage of the work, that of filling between the old piers. As a matter of fact, conditions were such that the plant could be operated to use the entire flow of the river during March and April so that by the end of April this first stage was completed. This established the new spill crest at El. 423, and at that time weather conditions appeared so favorable that it was decided to proceed at once with the erection of the new piers on the top of this crest. These, like the former piers, will support 12-ft. floodgates, thus permitting a maximum control of the reservoir level under favorable conditions to El. 435. The entire improvement is expected to be completed by July 1.

Los Angeles Power Bureau Rate Reduction Met by Utility

A reduction in electric light and power rates in Los Angeles will become effective Aug. 1. The necessary authority was given the Los Angeles Bureau of Power and Light, which is not under regulation by the California Railroad Commission, by an ordinance adopted by the city council June 15, and the Los Angeles Gas & Electric Corporation has announced that, with the approval of the Railroad Commission, it will meet the reduction announced by the bureau.

The change reduces the top lighting rate from 5.6 cents per kw-hr. to 5 cents per kw-hr. up to 50 kw-hr., which betters the top lighting rate of 5.6 cents per kw-hr. recently established by the Southern California Edison Company, serving contiguous territory. The combination lighting, cooking and heating rate will be reduced from 3 cents to 2.75 cents per kw-hr. and for large quantities to 2 cents per kw-hr. The new combination schedule provides that the domestic consumer shall pay the 5-cent rate for all energy normally used for lighting purposes, and for all energy used in excess of that amount the rates of 2.75 and 2 cents will apply. The schedule is available to all domestic consumers. The previous combination rates could be applied only to consumers with installations for electric ranges and other heavy-duty appliances. Certain classifications in the power schedules also will be reduced. E. F. Scattergood, chief engineer of the bureau, points out that the new rate schedule is especially favorable to domestic consumers and should go far toward encouraging the more general use of electrical appliances. Commenting upon the rate change announced by the bureau, William Baurhyte, president of the Los Angeles Gas & Electric Corporation, said:

> The rates of the Bureau of Power and Light not being subject to regulation, as are the rates of Los Angeles Gas & Electric Corporation, the bureau can, of course, make changes for reasons best known to it. It is significant that the reduction which has been announced was not made prior to the recent election. Notwithstanding the fact that 12 cents out of every dollar collected by the Los Angeles Gas & Electric Corporation are returned in taxation for the benefit of the people, the corporation will nevertheless meet the reduction announced by the city and will at once apply to the Railroad Commission for authority to put into effect the same schedule of rates.

Two California Companies Reduce Rates

In an effort to stimulate the sale of electrical energy and bring about a consequent reduction in service costs the San Diego Consolidated Gas & Electric Company, San Diego, and The Southern Sierras Power Company, Riverside, after informal conferences with the California Railroad Commission, have announced substantial reductions in electric lighting rates, effective July 1. The reductions will continue in effect for a year in the hope that the new rates will increase the use of electrical energy to a degree that will justify making them permanent.

Announcement that the Southern California Edison Company had adopted a like policy was published in Electrical West, June 1, p. 487.

In addition to the reduction in the general lighting schedule, the San Diego Consolidated Gas & Electric Company also filed an optional lighting schedule with the commission which will benefit large users of electricity and a revision of the commercial and industrial heating schedules substantially reducing the cost of both kinds of service. Effective as of April 1, all municipalities served by that company benefited from a substantial decrease in rates for the lighting and maintenance of ornamental light standards.

Departmental Reorganization of Key System Company

A complete change in the internal organization of the Key System Transit Company, Oakland, Calif., made necessary by the resignation of George H. Harris as general manager, has been announced by Lester S. Ready, president, of that company. The office of general manager will pass with the retirement of Mr. Harris, and a departmental organization will be substituted reporting directly to the president.

There will be five departments: operating, in charge of James P. Potter, for many years superintendent of transportation; engineering, with H. P. Bell, chief engineer, as engineering executive; financial, C. C. Vargas, financial executive; public relations, Paul Goldsmith, manager; legal, W. I. Brobeck, chief counsel, and the firm of Brobeck, Phleger & Harrison in charge of general matters, with M. C. Chapman associated. F. W. Frost, for the past thirty-five years secretary and treasurer, will retain both positions.

Program of Street Lighting Is Inaugurated by Seattle

A program of street lighting in the central business district of Seattle to cost, it is stated, in excess of $1,000,000 has been started by the city. The installation will consume approximately one year's time.

The type of pole to be used is the result of studies by the City of Seattle Lighting Department through its superintendent, J. D. Ross, working in conjunction with the Building Managers' Association of Seattle. The pole chosen for the central district will be known as the "Seattle Pole" and will be 22 ft. to the middle light center. It is made of cast bronze filled with concrete and will carry three globes of the Washington or Solux type, placed in an oblique row, this idea originating with the department's chief draftsman, L. H. Rose.

The poles will be installed by the engineering department, under the direction of Chester H. Morse, city engineer, through the assessment district plan, the cost of the improvement being borne by the abutting property. They will be wired for one to two kw. per globe, according to the location. The department of lighting will operate the system.

This is the "Seattle Pole" chosen by the city for the lighting of its central business district.

Voters Defeat Municipal Utility Measures in Two Cities

Disapproval of proposed municipal utility measures was expressed by voters of both San Francisco and Los Angeles at special elections held recently in those cities.

On June 14 the electorate of San Francisco voted for the fourth time on the proposal to issue bonds for the purchase of the Spring Valley Water Company properties. The proposed bond issue, which was for $40,000,000, this time was defeated by a margin of 5,000 votes. A $4,700,000 proposed bond issue to finance the extension of the municipal street railway system also was defeated.

In Los Angeles on June 7 the proposal to institute proceedings to evaluate the properties of the Los Angeles Gas & Electric Corporation with a view to their ultimate acquisition by the city was defeated decisively, as was the measure authorizing the Bureau of Power and Light to lease harbor lands as a site for a standby steam plant estimated to cost approximately $4,000,000.

Personnel Changes Announced by Utah Power Company

Three changes in important executive positions, effective June 15, have been announced by the Utah Power & Light Company. H. M. Ferguson, manager of the company's Salt Lake division; A. P. Merrill, manager of the Ogden division, and J. F. Orr, sales manager of the Idaho Power Company, with offices at Boise, Idaho, are the individuals affected by these changes.

Mr. Ferguson has assumed a post of larger responsibility in the general offices of the Utah Power & Light Company, as assistant to P. M. Parry, commercial manager. Mr. Merrill has succeeded Mr. Ferguson as manager of the Salt Lake division, and Mr. Orr has become manager of the Ogden division, succeeding Mr. Merrill.

Extension of 220-kv. Line Begun by Great Western Company

Construction has been started by the Great Western Power Company of California on a 220-kv. steel-tower transmission line to connect its Bucks Creek power house, now being built on the Feather River, with its Brighton substation near Sacramento, Calif. This line, which will be about 100 miles long and cost approximately $1,920,000, is an extension of the 105-mile Brighton-Merced line which connects Brighton substation with the company's Wilson substation at Merced where interconnection is made with the system of the San Joaquin Light & Power Corporation.

Full details of the completion of that line and the dedication of the Wilson substation Aug. 14, 1926, were published in the Journal of Electricity, Sept. 1, 1926, p. 180.

Co-operative Spirit Made Possible Melones Project Guests Told at Dedication

The spirit of co-operation that made possible the Melones water and power development was paid fitting tribute at the dedicatory ceremonies held June 11 at the Melones hydroelectric power plant of the Pacific Gas and Electric Company on the Stanislaus River about twelve miles below the famous mining town of Melones and eight miles west of Jamestown, the "Jimtown" of the days of '49. These ceremonies marked the completion of the co-operative irrigation and power development project between the Pacific Gas and Electric Company and the Oakdale and South San Joaquin Irrigation districts under an agreement entered into in 1925 whereby the irrigation districts built the dam and the power company the power plant.

R. E. Fisher, vice-president of the Pacific Gas and Electric Company in charge of public relations and sales, presided at the dedication which was witnessed by about two hundred and thirty people, most of whom were newspaper men of northern California, guests of the central station company. After an address by C. P. Cutten, of the Pacific Gas and Electric Company, John Hancock, representing the irrigation districts, paid a glowing tribute to the fine spirit of co-operation that had made possible the construction of the Melones project. The plant then was placed in operation by Miss Hazel McFarland of the Folsom, Calif., Telegraph. This was singularly appropriate in that Folsom was the site of the first commercial hydroelectric power plant in California.

The Melones power house contains two 13,500-kva. generators driven by 20,000-hp. vertical turbines operating under a variable head of from 140 to 235 ft. and was built at a cost of $2,500,000. The dam, of the constant radius, arch type, is a concrete structure 210 ft. high, 585 ft. long, impounds 112,500 acre-ft. of water and cost $2,200,000. Under the agreement the power company will pay the irrigation districts for the use of water a semi-annual rental of $64,687.50, or a total of $5,175,000 over a period of forty years, this amount entirely paying off the bonded indebtedness of the districts plus the interest. At the close of that period payments cease and the districts and the power company will divide the expense of upkeep. The districts have control of the water stored from March 1 to Oct. 31 each year, and the power company for the rest of the year.

The excursion planned for the newspaper men was a particularly enjoyable one. Leaving Stockton at 7 o'clock on June 11, the guests were taken on a tour through the country surrounding the two irrigation districts. Luncheon was served at the Melones plant prior to the dedication, and after the ceremony the party was driven to Sonora where the visitors were taken through the plant of the Pickering Lumber Company. Then followed a trip through the "Bret Harte country," terminating at the Pacific Gas and Electric Company's Stanislaus power house where a "bridge dinner" was served. The bridge in this instance was across the Stanislaus River and long tables had been erected on it for the accommodation of the guests.

Melones dam and power house.

Miss Hazel McFarland, of the Folsom Telegraph, placed the Melones power plant in operation. With her on the platform were (left to right)—C. P. Cutten, of the Pacific Gas and Electric Company, John Hancock, representing the irrigation districts, and R. E. Fisher, vice-president of the power company in charge of public relations and sales.

In the evening after an address of welcome by Frank A. Leach, Jr., vice-president and general manager of the company, the financial side of the project and its engineering features were discussed by A. F. Hockenbeamer, vice-president and treasurer, and A. H. Markwart, vice-president in charge of engineering, respectively. Paul M. Downing, vice-president in charge of electrical construction and operating, gave a description of the project and Charles S. Northcutt, division manager, discussed "The Future." The program concluded with musical numbers and an amateur entertainment by members of the local organization. In the morning after breakfast on the bridge the guests inspected the plant and went up the incline railway to the forebay. Then luncheon was served, and the party left Stanislaus returning via San Andreas to their various destinations.

Decision Rendered in Turbine Patent Infringement Case

A decision handed down by the United States circuit court of appeals sitting at Atlanta, Ga., in a suit brought by the Allis-Chalmers Manufacturing Company against the S. Morgan Smith Company finds the defendant guilty of infringement in the use of pressed steel casings for hydraulic turbines. The decision, which reverses the ruling of a lower court from which the case had been appealed, holds the patent valid and finds that the changes in construction made by the S. Morgan Smith Company do not avoid infringement.

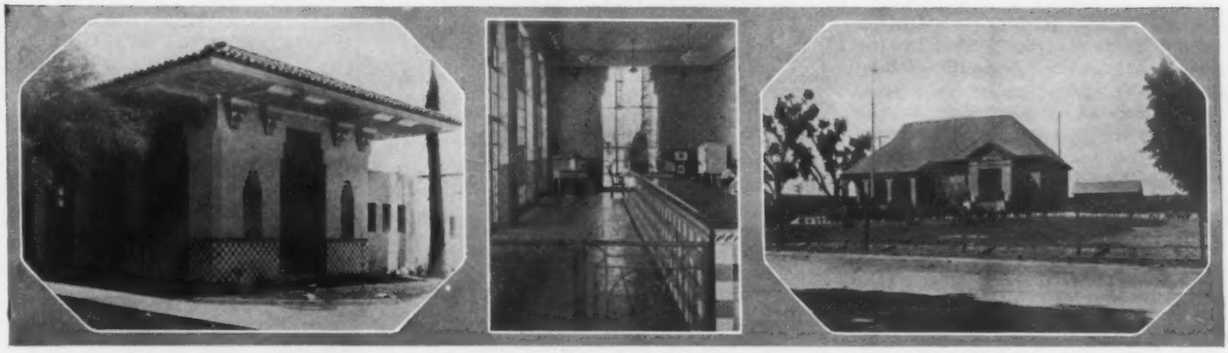
The suit originally was brought by the Allis-Chalmers company against the Columbus Electric & Power Company, for the use of the casings and the defense was assumed by the S. Morgan Smith Company, which manufactured them, thus holding the users harmless. (Journal of Electricity, April 15, 1926, p. 312.)

Arizona State Institutions File on Colorado River Site

The board of directors of state institutions of Arizona has filed an application with the Federal Power Commission covering a section of the Colorado River in the region of Parker. It is proposed to build a dam to raise the river to a level of 90 ft., creating a reservoir of 1,900,000-acre-ft. capacity. The power house is to be built on the Arizona side of the river where an ultimate installation of 200,000 hp. is proposed. About 100,000 hp. will be developed initially.

The application is in conflict with previous applications by the Beckman & Linden Engineering Corporation, San Francisco, the City of Los Angeles, and the Southern California Edison Company. No action will be taken on the application as all action on projects in the Colorado Basin has been suspended.

With the Southern Sierras Power Company



The charming example of Spanish architecture at the left is the combined office and substation of The Southern Sierras Power Company at Brawley, Calif., in the Imperial Valley. The office occupies the entire front of the building; the substation fills the rear left-hand corner, and the rest of the space is given over to the district construction headquarters, warehouse and garages.

No effort has been spared to make the place cool, comfortable and attractive. The circular designs in the wide eaves, which provide welcome shade, are open grillwork for ventilation of the attic to keep the interior cool. Three palm trees were moved to enhance the beauty of the garden, which has been planted in lawn and shrubs. The building is floodlighted at night by eight 250-watt X-Ray reflectors mounted opposite the pillars and pointed upward to illuminate the posts and the underside of the eaves, while over each of the end windows are four 250-watt reflectors built into the ceiling for illumination of window displays and similar purposes.

The center view shows the interior of the Brawley office and salesroom, with some of the range and refrigerator models on which most of the merchandising effort is concentrated. A particularly pleasing feature is the grillwork gate with its design of transmission towers and conductors. D. S. Bromley is the district representative of the company at Brawley.

On the right is an illustration of one way to make "the desert blossom like the rose" as practiced by the Southern Sierras company. The building formerly was an abandoned school. The company bought it and converted it into a district office and superintendent's residence at Victorville, Calif., on the edge of the Mojave Desert. In the rear of the building are the district garage, warehouse and pole yard. The property covers almost a city block.

New Los Angeles Engineers Club Has Membership of 300

More than 300 members of the engineering profession constitute the membership of the Engineers Club recently organized in Los Angeles. The purpose of the club is well expressed in the premable to its constitution:

"Cognizant of their public obligation, and desiring to promote fellowship, engineers and allied professional men of the Southwest have banded themselves together as the Engineers Club in order that they may take their proper place in the community and by common accord give expression to those things best expressed by the engineer, and in order that they may derive mutual benefit through social contact and co-ordination of effort."

The official personnel is made up as follows: president—Frank H. Olmsted, consulting civil engineer; senior vice-president—John E. Hodge, consulting mining and exploratory engineer; junior vice-president—H. L. Doolittle, mechanical engineer, who is construction engineer for the Southern California Edison Company; secretary and treasurer—Ralph F. Ware, civil engineer, contractor of long experience; directors—E. L. Mayberry, architect and engineer; S. E. Gates, electrical engineer, manager Los Angeles branch of General Electric Company; Henry L. Payne, of Payne & Baverstock, chemists; J. E. Macdonald, electrical and mechanical engineer, secretary Joint Pole Committee; Myron C. Burr, civil engineer, president California Insurance Bureau.

Washington Company Increases Mileage of 110-kv. Lines

With the addition of 127.62 miles of transmission line operated at 110 kv. from Long Lake to Spokane, Wash., and from Spokane to the Coeur d'Alene mining district of the Idaho panhandle, The Washington Water Power Company has increased its total mileage of 110-kv. lines to 424.25.

The line from Long Lake to Spokane and south of Spokane to the Latah substation, a total distance of 60.2 miles, has been in operation for two years at 60,000 volts. From Latah to Mullan Junction in Idaho the old 60-kv. line has been replaced by a new 110-kv. line, and the mining district of northern Idaho now has a direct line at that voltage from the Long Lake power station and Little Falls station.

The Washington Water Power Company is connected with the system of the Montana Power Company at the Burke substation, about seven miles east of Mullan Junction, and with the Chicago, Milwaukee & St. Paul lines at Taunton, Wash., which gives a complete interconnection from the Montana system through northern Idaho and eastern Washington, the C. M. & St. P. and the Puget Sound Power & Light Company to the Coast at 110 kv.

Dam-Site Survey in Bear Valley and Stanley Basin, Idaho

Engineers of the Geological Survey, Interior Department, during 1925 made two dam-site surveys and special hydraulic investigations in Bear Valley and Stanley basins, lying 6,200 ft. above sea level in the headwater region of Salmon River. It was found that 900,000 acre-ft. could be stored in Bear Valley and diverted onto the Snake River plains, but that such storage and diversion would require two large concrete dams, one 340 ft. and one 414 ft. high; two earthen dikes, one 140 ft. and one 50 ft. high; and two tunnels, one 8 miles and one 24 miles in length. The reservoirs created would flood 36,000 acres of land that is now in large part valuable only for grazing. If these sites were used for increasing the flow of Salmon River for developing power the potential power of the Salmon River basin would be increased by 126,000 hp. for 90 per cent of the time and 254,000 hp. for 50 per cent of the time.

The results of these surveys and investigations are contained in a report recently prepared by W. G. Hoyt, hydraulic engineer, entitled "Storage Possibilities in Bear Valley and Stanley Basin, Idaho." This report is in manuscript form and may be examined at the office of the Geological Survey in Washington, D. C., or a copy may be seen at the district office of the Geological Survey in Boise, Idaho.

Third Copco Employee Honored by Insull Medal Award

Emmit Knackstedt of Yreka, Calif., an employee of The California Oregon Power Company, recently awarded the Insull Medal for saving the life of Barney Gray by the Schaefer prone-pressure method of resuscitation, is the third member of the Copco organization who has had this honor conferred upon him. The other two were Howard Dynan of Medford, Ore., and Ted Montgomery of Klamath Falls.

On July 19, 1925, Emmit Knackstedt was engaged with Barney Gray in making repairs to the Montague substation. They were replacing some disconnecting switches which had been destroyed a short time before by lightning. Mr. Gray was in the substation putting a switch in place behind the switchboard. Mr. Knackstedt was engaged at the moment outside the substation building. He heard the familiar flash of a short circuit and a groan from Mr. Gray. Rushing inside he found that the switch in Mr. Gray's hand had slipped into a line switch adjoining, and Mr. Gray was stretched on the floor unconscious and not breathing. Hurriedly dragging Mr. Gray out onto the floor in front of the switchboard, Mr. Knackstedt applied the resuscitation method. The man was to all appearances dead, but after ten minutes' work Mr. Knackstedt was rewarded by a return

Emmit Knackstedt (left) being presented by P. O. Crawford (right), vice-president and general manager, The California Orefon Power Company, with the Insull Medal awarded for saving the life of a fellow employee.

of life. After a few hours' rest Mr. Gray was back on the job, none the worse for his experience. Without the prompt ministrations of Mr. Knackstedt Mr. Gray would not have lived.

The official presentation of the medal was made at the Siskiyou Division headquarters of the company at Yreka by P. O. Crawford, vice-president and general manager of The California Oregon Power Company, who was selected by The National Electric Light Association to make the award. In making the presentation, Mr. Crawford gave a most interesting address upon the subject of "accident prevention," directing attention to the value of preparedness and commending Mr. Knackstedt for his cool and efficient method of handling the emergency which arose.

Short talks on the subject of accident prevention also were made by S. M. Bullis, who has charge of safety work for the company, and O. G. Steele, manager of the Siskiyou Division. A large group of employees from all parts of the company's northern California territory was present at the meeting.

New Magazine for Information of Northwest Utility Users

Of interest to the electrical industry in the Northwest is the recent appearance of the "Utility Users' Magazine," published in Seattle by E. H. Thomas, formerly manager of the Washington Public Utility Information Bureau. Its nature and purpose as defined on its masthead is, "A purely informative publication devoted to the public utility industry and its problems, intended primarily for the information of utility patrons." It is to be issued monthly.

According to the publisher's announcement in the April issue, which is number two of volume one, the magazine will contain interesting facts about the service rendered by electric, gas, telephone and transportation companies; the information will be presented in a non-technical manner so that it will be readily understood by the layman; and thus it "will not infringe upon the domain either of the technical journal or the company publicity representative." An effort is being made to get the publication into the hands of as many utility patrons as possible.

Arizona Votes to Tax Federal Property Within State

A heavy vote in favor of two proposed constitutional amendments relating to the Colorado River development question was cast by the voters of Arizona in a state-wide election held recently.

One amendment provided for the elimination from the state constitution of a provision prohibiting the state from taxing federal properties within the state. The other would remove from the state constitution a provision permitting the federal government to reserve any or all dam sites in the state. The clauses affected were held to be damaging to Arizona's best interests in the matter of the construction of the proposed Boulder Canyon dam, according to advices from Arizona.

Utah Electrical League Appoints New Field Secretary

RICHARD E. FOLLAND

The Electrical League of Utah has appointed as its field secretary Richard E. Folland, for the past year associated with the Utah Power & Light Company, succeeding C. Louis Collins, resigned. Mr. Folland's years of experience in sales activities, together with his close association with the work of the Electrical League of Utah since he has been engaged in commercial lighting work with the Utah Power & Light Company, make him especially well fitted for his new duties.

His experience includes three years in the employ of the Salt Lake Electric Supply Company and a year with the Capital Electric Company, both of Salt Lake City, a four-months technical course at the factory of the Sullivan Machinery Company in Claremont, N. H., followed by two years in sales work for that firm in the Intermountain territory. In 1922 he went to New York, where he became associated with the Howells Cine Equipment Company, in the capacity of manager of their radio department, handling wholesale and retail radio and motion picture equipment. He remained with that firm for a period of three years, returning to Salt Lake City in February, 1925. During the ensuing eight months he was in the employ of the Mack International Truck Company in sales work and then in December he entered the employ of the Utah Power & Light Company.

Artistic Lighting Equipment Association Absorbs Dealers' National Organization.—In line with the policy recommended by Herbert Hoover, Secretary, United States Department of Commerce, that trade organizations in the same field of endeavor consolidate, the better to unify and simplify their operations, the Artistic Lighting Equipment Association, composed of manufacturers of lighting equipment of all kinds and manufacturers of parts and supplies, has absorbed the National Association of Lighting Equipment Dealers. G. Fred Laube, Laube Electric Corporation, Rochester, N. Y., former president of the N.A.L.E.D., will head the dealers' group.

Los Angeles Aqueduct Dynamited for Fourth Time in Month

For the fourth time within a month the Los Angeles aqueduct, bringing water from Owens Valley to Los Angeles, was dynamited by persons unknown, presumably another sortie in the warfare between the residents of Owens Valley and the city. The blast, which occurred at Puddle Creek Delta, two miles southwest of Lone Pine, shattered the concrete lining of a 16-ft. section of open waterway about 6 ft. deep. The damage was repaired easily.

The first two blasts in this series of dynamitings occurred May 27 and 28. The former took place 170 miles north of Los Angeles in No Name Canyon siphon below Haiwee reservoir at the south end of Owens Valley, and the length of pipe destroyed by the blast, collapsed by vacuum or washed out by escaping water, totaled 476 ft. The latter tore away two 30-ft. sections of flanged welded steel in the penstock supplying the Big Pine power house in Owens Valley about 16 miles south of Bishop. On June 5 a third blast was discharged under the open canal section of the aqueduct in Owens Valley a few miles south of Lone Pine and near the Cottonwood power plant, resulting in slight damage.

In May, 1924, the aqeduct was dynamited near Lone Pine; in November of that year Owens Valley residents seized the gates and diverted the flow; and in May, 1926, the aqueduct again was dynamited near Lone Pine.

Northwest Utility Announces Changes in Personnel

Several changes in the personnel of the commercial department of the Puget Sound Power & Light Company, Seattle, recently have been announced. R. W. Clark, for the past several years sales manager of the central district with offices in the Electric Building, has been promoted to be merchandise sales manager for the entire territory served by the corporation, taking the place of R. W. Lindley, who is ill. Headquarters will be maintained in Seattle.

R. U. Muffley, district manager for the Puget Sound Power & Light Company in the eastern district, Wenatchee, Wash., succeeds Mr. Clark, and L. R. Coffin, formerly manager of the company's properties at Bellingham, has succeeded Mr. Muffley.

Group Insurance for Employees of Northwestern Utilities

Group life insurance has been taken out for the employees of the Pacific Power & Light Company, Northwestern Electric Company and affiliated companies of Portland. Any employee of any of the companies who has been in the service of his company for six months or more is insured for $500, the entire cost of which is paid by the company. At the same time the employee may subscribe for $500 additional insurance at a cost to him of 30 cents per month, the balance of the cost of the additional insurance being paid by the company. At the end of the first year of continuous service and of each succeeding year thereafter the employee's policy may be increased by $200 until a maximum of $3,000 is reached at the end of ten years' service. This additional insurance costs the employee at the rate of 6 cents per month per $100, the balance of the cost being absorbed by the company.

The insurance likewise contains disability benefits. These benefits consist of a waiver of premiums and the payment to the disabled insured of varying monthly installments based on the amount of insurance carried at the time disability was incurred. The disability may occur from sickness or accident or from any cause, anywhere contracted, while the insurance is in force prior to age 60. Free visiting nurse service also is included in the insurance plan and covered by the premiums.

Canadian Company Plans New Building.—The British Columbia Electric Railway Company, Ltd., is planning to erect a three-story building at the corner of Granville and Dunsmuir Streets, Vancouver, according to announcement of W. G. Murrin, vice-president. The building, which is to be started early in August, will cost about $150,000.

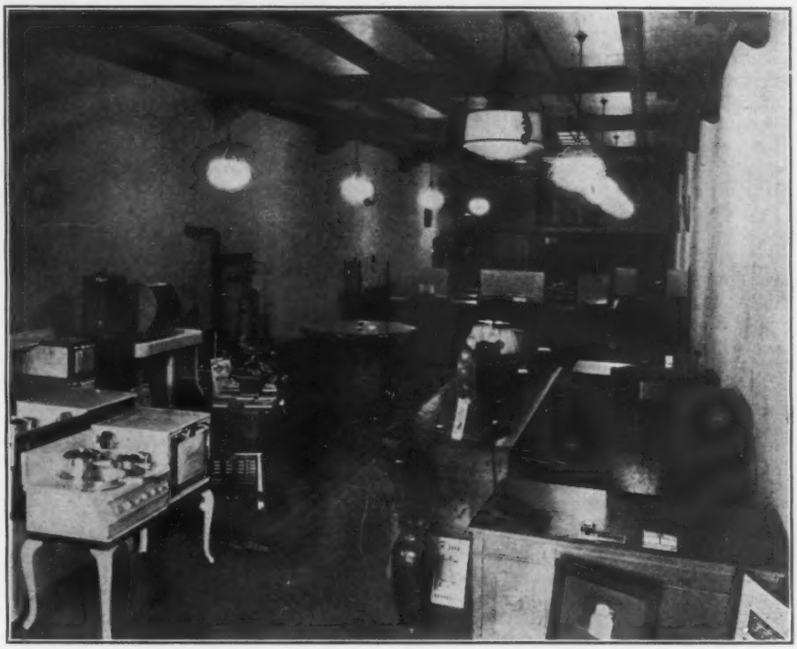
New Company Formed to Manage Foshay Company Interests

Public Utilities Consolidated Corporation with general offices in Minneapolis has been formed to operate and manage electric, gas, water, and ice companies in which the W. B. Foshay Company holds a controlling interest.

Properties in several states now being operated by this company will be taken into the new corporation as subsidiaries. Vermont properties serving seven towns will be incorporated as Public Utilities Vermont Corporation. The entire electric system serving a number of towns in northwestern Kansas will be operated as Public Utilities Kansas Corporation, and similar corporations will be formed for properties in Arizona, Idaho, California and other states in which the corporation has or is acquiring utility interests.

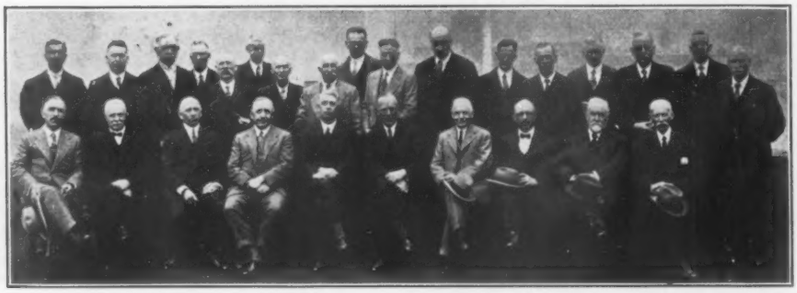
Pacific Gas and Electric Company to Buy Utility of Vacaville, Calif.—Announcement has been made that, subject to the approval of the California Railroad Commission, the Pacific Gas and Electric Company has entered into an agreement with the Vacaville Water & Power Company whereby the former company will take over the stock of the latter in exchange for preferred stock of the Pacific company.

A Friendly Office and Salesroom



The Coast Counties Gas & Electric Company recently remodeled its offices and salesroom in Santa Cruz, Calif., using a color scheme that combined warm browns, reds and orange with gray woodwork, and the result is particularly attractive and effective. Models of all the appliances that the company merchandises are on display, and the arrangement of these and of the other furniture lends an atmosphere of friendliness. A feature of the room is the absence of large "Pay Bills Here" indicators, only a very small sign marking the cashier's window, a practice that makes for good public relations.

Eight Hundred and Fifteen Years of Service



Twenty-four employees who had been with the British Columbia Electric Railway Company, Vancouver and Victoria, for thirty years or more recently were presented with gold watches by George Kidd, president of the company. The occasion was the thirtieth anniversary of the taking over of the electric light and power and railway properties by the company from its predecessors. The total length of service of the old-timers was 815 years or nearly 33 years each.

They are shown photographed with W. G. Murrin, vice-president of the company; George Kidd, president, and F. R. Glover, general executive assistant, who are seated in the front row fifth, sixth and seventh, respectively, from the left end.

Crown Willamette Company Gets Campbell River Rights

Negotiations between the Provincial Government and representatives of the Crown Willamette Paper Company, which have been under way for several months, have been completed, according to announcement of T. D. Pattullo, minister of lands for British Columbia.

The Crown Willamette Company has acquired the water-power rights on the Campbell River, on Vancouver Island, and has agreed to develop them and to erect a pulp and paper plant, the first unit of which shall have a capacity of 200 tons of newsprint per day and the ultimate objective shall be 1,000 tons of newsprint per day. The plant probably will be situated at Duncan Bay, a few miles north of the mouth of the Campbell River whose potential possibilties are estimated conservatively at 150,000 hp., according to R. J. G. Conway, chief engineer in British Columbia for the water powers department of Canada.

Salmon River Power Resources Large, Surveys Show

The results of surveys and investigations of the power resources of the Salmon River, Idaho, made by the U. S. Geological Survey recently have been compiled by W. G. Hoyt in a report entiled "Power and Storage Possibilities of Salmon River, Salmon to Stanley." This report, which is in manuscript form, is open for public inspection at the district offices of the U. S. Geological Survey, Boise, Idaho, Salt Lake City, Utah, and at Washington, D. C. The maps referred to in this report are published in seven sheets printed in two colors, entitled "Plan and Profile, Salmon River, Salmon to Stanley," and may be purchased from the Geological Survey, Washington, for 70 cents.

The report indicates that eventually nearly 2,000 ft. of river fall may be utilized at 19 power sites at which it would be possible to develop 84,000 hp. for 90 per cent of the time, or 114,000 hp. for 50 per cent of the time.

Boulder Dam and New Flood Control Bills—Power Commission Transfer Opposed

Washington Correspondence.

Advocates of the Swing-Johnson Bill see in the forthcoming flood control legislation an opportunity to advance the Boulder Canyon project. Representative Swing has been very active in Washington during the high-water period. He recently accompanied the flood control and commerce committees on their trip down the river. It is these committees that will write the new flood control bills which will be laid before Congress. Evidently it is the plan to try to put through Colorado River legislation along with that applying to the Mississippi.

Despite the enterprise of the Swing-Johnson advocates, it is apparent that there will be difficulties to overcome. The Mississippi Valley representatives have no objection to the inclusion of the $160,000 needed to protect the Imperial Valley against flood, but they will fight efforts to tack onto their bill the strongly opposed Boulder Canyon Bill.

The spectacular debate during the closing days of the last session had the effect of focusing public attention on the issues involved. There is abundant evidence that the public has learned that there is no excuse for spending money of federal taxpayers on the Colorado River, as private capital has expressed its willingness to relieve flood danger and take care of irrigation needs in return for the privilege of developing the power. While consumers of hydroelectric power are objecting more and more to the saddling on them of such costs as irrigation and flood control, it is an advantage to the federal taxpayer, and in the case of the Colorado the amounts involved are small when compared with the total amount of power available.

The suggestion of the Secretary of the Interior that the Federal Power Commission be placed under the jurisdiction of his department has met with determined opposition from the War Department and the Department of of Agriculture, which, with the Department of the Interior, administer the Federal Water Power Act.

To transfer the duties and the responsibilities of the Federal Power Commission to the Department of the Interior, in the opinion of the Secretary of War, "is not consistent with the principles of good organization, is not in line with sound public policy and is not calculated to secure greater efficiency in the conduct of the public service." Secretary Davis calls attention to the conclusions of the Joint Committee on Reorganization which hold that it would be of doubtful wisdom to entrust the functions of the Federal Power Commission to a single department, as the department in control would be open to the criticism that the interests of the other departments were being unnecessarily and improperly subordinated.

In addition, Secretary Davis expresses the view that the proposed change would not be in the interest of economical administration. He points out that the commission at present maintains personnel in Washington for the purpose of reviewing and presenting to the commission reports from the field officers of the departments. This force would remain unchanged if the transfer were made. The field work of the commission is performed by the field staff of the three departments. To transfer the water power administration, Secretary Davis feels, would involve the assumption by that department of all field activities, which would necessitate increases in personnel and result in additional costs.

The Secretary of Agriculture asserts that "were the work to be centralized in any one department, the Department of Agrculture, through whose initiative our federal power policies came into being, would be a more appropriate department in which to centralize the work." Mr. Jardine hastens to say, however, that "this is not advocating because in my judgment the reasons which actuated Congress to create the commission as a cor-ordinating body are just as logical and just as compelling today as when after long-studied deliberation that plan was formally approved.

Injunction to Restrain Arizona Company Is Refused

The decision of the circuit court of appeals for the ninth circuit that The Southern Sierras Power Company is not entitled to an injunction to restrain the Arizona Edison Company from generating its own electric current or purchasing it from others will stand, the United States Supreme Court having refused to grant a writ of certiorari to review the case.

The Southern Sierras company sought an injunction to prevent the Arizona company from building its own plant to supply electricity at Yuma, Ariz., or from purchasing power from the United States Government at the Syphon Drop power plant, alleging that the Arizona company had a contract to purchase power from it which had six years yet to run. The Arizona company alleged that service by the Southern Sierras company was unsatisfactory and brought forward an order from the Arizona Corporation Commission to that effect.

The district federal court granted an injunction to the Southern Sierras company, but this was reversed. The appeal was ordered dismissed when the case reached the circuit court of appeals and this order will stand, in view of the refusal of the supreme court to review the case. In view of this ruling, if the Southern Sierras company feels that its contract has been violated, it has a remedy in a suit for damages for breach of contract, but cannot depend on an equity suit for an injunction as its remedy.

Los Angeles Power Department Made Financial Entity

An ordinance adopted June 15 by the Los Angeles city council makes the Water and Power Department of that city a financial entity, independent of the city government, with power to go into the market and borrow money and to issue notes or other certificates of indebtedness. To contract these loans the commissioners must determine that an emergency exists, the loans must be for not longer than five years and the total loans shall not exceed one-third of the total gross operating revenue of the department during the preceding fiscal year.

This independent borrowing right for the Water and Power Department was placed in the new city charter in December, 1923, and the city council stated that while no emergency exists at the present time, the ordinance putting the charter provision into effect was desired so that if an emergency did arise loans could be obtained.

Under this provision and ordinance the Water and Power Department has rights that no other city department has, as all other departments must ask for funds which are provided through bond issues approved by the voters, and these funds, together with budget appropriations, constitute their sole financing.

News Briefs

Puget Sound Company Reduces Rates.—The Puget Sound Power & Light Company, Seattle, recently announced a voluntary reduction of approximately 12 per cent in residential and commercial lighting rates in Whatcom, Island and Snohomish Counties, Wash., with the cities of Everett, Lowell and Bellingham excepted. The new schedule filed with the State Board of Public Works at Olympia was made possible by increased use of electricity, company officials declared. Residential rates have been cut from 8½ cents a kw-hr. for the first 55 hours to 7½ cents a kw-hr. for the first 60 hours, and commercial rates reduced 1 cent a kw-hr. This is the second reduction in two years and affects 6,000 rural customers, 7,000 town and city customers and forty towns and cities.

New Rates Established for Peoples California Hydro-Electric Corporation.—The California Railroad Commission has established rates for the distribution of electric energy by Peoples California Hydro-Electric Corporation applicable to its business in Mendocino County, in the territory formerly served by Fort Bragg Electric Company and Mendocino Electric Light & Power Company. The commission found a reasonable rate base for the utility to be $162,000, and the rates prescribed are estimated to yield a return of about 8½ per cent upon such a rate base. The utility stipulated at the hearing before the commission that it was willing to place the rates in effect for a trial, and if the rates result in revenues that the company feels under all circumstances can be reduced, it is the company's intention to reduce them.

Increase in Water-Power Development in Idaho Shown by U. S. Geological Survey Report.—As an indication of the rapid expansion and growth of water-power development in Idaho during the last few years, tabulations prepared by the U. S. Geological Survey show that in 1922 there were in operation 45 plants with a total rated waterwheel capacity of 224,000 hp. At the close of 1926 the number of plants was increased to 58 with a combined waterwheel capacity of 320,000 hp., showing an increase of 95,600 hp. in this four-year period. Power projects under construction or being contemplated for near future development will increase the present power installations by many thousand horsepower.

Telephone Operations of Company Discontinued.—The Sacramento Valley Telephone Company, a subsidiary of The Pacific Telephone & Telegraph Company, has taken over the operation of the telephone properties of the California Telephone & Light Company, which is controlled through stock ownership by the Pacific Gas and Electric Company. The California Telephone & Light Company has been engaged in the business of generating, transmitting, distributing, selling, buying, and dealing generally in electricity for light, heat and power, and also in the business of operating a telephone and telegraph system. It has been desirous to discontinue its telephone operations and devote its efforts exclusively to the conduct of the business of an electrical corporation.

Western Electric Company Directors Propose Increasing Outstanding Stock.—The board of directors of the Western Electric Company, Inc., has recommended action by the stockholders involving an increase in the authorized number of shares from 1,000,000 to 4,000,000 in order that the present shares may be split up into smaller units, on the basis of 5 for 1. This will result in changing the present outstanding shares from 750,000 to 3,750,000 without par value.

A. I. E. E.

Vancouver Section.—At the annual meeting of the section the following were elected to serve as officers for the 1927-8 season: chairman—A. C. R. Yuill; secretary—J. Teasdale. The executive committee consists of R. L. Hall, A. Vilstrup and C. W. Colvin.

Pacific Coast Convention.—Plans are well in hand for the Pacific Coast convention to be held at the Hotel Del Monte, Del Monte, Calif., Sept. 13-16, and it bids fair to be the outstanding A.I.E.E. convention of recent years. The program committee is making particular effort to secure papers of a high quality. The number of papers will be less than has been the case in past conventions, and in view of the excellence of the papers and the importance of the subjects dealt with, the committee is making definite arrangements so that there will be ample time for discussion.

Officers Elected at Annual Meeting.—Bancroft Gherardi, vice-president and chief engineer, American Telephone & Telegraph Company, New York City, was elected president of the American Institute of Electrical Engineers at the annual business meeting held in the Engineering Society Building, New York, May 20. Other officers elected were: vice-president—J. L. Beaver, Bethlehem, Pa.; C. O. Bickelhaupt, Atlanta, Ga.; O. J. Ferguson, Lincoln, Neb.; E. R. Northmore, Los Angeles, Calif.; A. B. Cooper, Toronto, Ont.; managers—F. C. Hanker, East Pittsburgh, Pa.; H. P. Liversidge, Philadelphia, Pa.; E. B. Meyer, Newark, N. J.; national treasurer—George H. Hamilton, Elizabeth, N. J. (re-elected).

Contractors, Dealers and Inspectors

"Electragist" Editor Addresses Denver Meetings

S. B. Williams, editor of "The Electragist," presented a forceful and frank discussion of the situation of the electrical contractor in respect to the industry at a meeting of the Electrical League of Colorado not long ago. The meeting was attended by 26 people representing all branches of the industry.

A comment on the talk of Mr. Williams describes it as follows: "Mr. Williams' talk consumed 35 minutes—full minutes—of a frank discussion of our sins of omission and commission in the past, and how they can be corrected for the benefit of all of us through the co-operation of the various branches. The figures on electrical growth in the past, as applied to old and new construction, and what the industry can expect in the future, were particularly appropriate. Mr. Williams' talk was voted by those present as one of the most interesting and instructive—and, above all, frankest—we have had in some time."

Mr. Williams also talked to the Denver Electrical Contractors and Dealers Association at its dinner meeting May 19. He did not extend his trip any farther West than Denver.

Motor Section Formed.—A motor section of the California Electragists, Southern Division, was formed at a recent meeting held at the offices of the Los Angeles Electrical Contractors and Dealers Association in Los Angeles. Motor dealers from Los Angeles, Pasadena, Long Beach, San Bernardino and Oxnard were present at the meeting. Co-operation with the motor section of the Northern Electragists in a plan for improving the market condition in motor work are in contemplation.

The city of Camas, Wash., has awarded to **Herbert C. Moss,** Seattle, contract for street lighting. The job is one which is estimated to run over $10,000.

Beecher Takes Manahan's Place; Heads California Inspectors

Amending the articles of association of the California Association of Electrical Inspectors, the membership of that body by a letter ballot recently empowered its executive committee to accept the resignation of R. H. Manahan, chief of the Department of Electricity, Los Angeles, as president of the association, and name in his place Harry N. Beecher, chief electrical inspector of the same city.

Mr. Manahan resigned on account of the pressure of his numerous duties. At the time of his election there was some doubt as to whether he would accept the position, although according to the organization of the association he was in line for the presidency for this term, having served as vice-president last year. Mr. Manahan made known his wishes to be relieved of the duties as president but it was thought that he could perhaps be persuaded to fill the office. Feeling that it was impossible to carry on, Mr. Manahan suggested that his assistant and associate, Mr. Beecher, be given the position in his stead. Following meetings of the executive committee and letter ballots to the membership Mr. Beecher was appointed to fill the vacancy.

Left to right—D. H. Alexander, city electrician of Long Beach, Calif., and Harry N. Beecher, newly elected president of the California Association of Electrical Inspectors.

In his statement to the members of the association, Mr. Beecher wrote as follows:

Members of the California Association of Electrical Inspectors. Greetings:

As Mr. Manahan refused to accept the presidency to which he was elected at our March meeting, it became necessary for the executive committee to fill the vacancy.

On March 19 I received word from our secretary stating the executive committee had elected me president.

This procedure is not at all in accord with my wishes but rather than cause further embarrassment to our association and the good work which it has done, I am accepting the honor conferred, assuring you I will hold the interests of our association always in mind and render such assistance as I may be able to give.

As effort is needed for the success of any enterprise, I am asking your wholehearted support in our activities and to fulfill the duties in connection with the work that your executive committee may ask of you.

I have reviewed the personnel of the previous committees and am of the opinion that, with the exception of a few changes, it will be advisable to maintain the same committees. Those on the National Code did not function extensively last year and this will afford you another opportunity to do so.

I request that each member obtain the application of at least one member between now and next March meeting and I am especially interested to have those join us who are actively engaged in inspection work. Let us be able to say that California has a one hundred per cent membership of electrical inspectors.

Although I am very much dissatisfied with your choice and regret it became necessary to elect a second president for one year, I wish to sincerely thank you for considering me in this matter.

With kind wishes to you all, I remain,

Very sincerely yours,

H. N. BEECHER,
President.

May 26, 1927.

F. D. Weber, electrical engineer with the Oregon Insurance and Rating Bureau, Portland, and secretary of the Northwest Association of Electrical Inspectors, left in June with his family for a four months' trip to Europe, to visit France, Italy, Switzerland, Germany, Austria, Belgium, Holland, England, Scotland and Ireland.

Rollin Smith, electrical engineer and author of "The National Handbook for Wiremen," has removed the office of his company from 124 West Fourth Street, Los Angeles, Calif., to 515 O'Farrell Street, San Francisco.

The Watts Electric Company, Seattle, **Jack Watts,** owner, has moved from its location at 108 Cherry Street to larger quarters at 608 Second Avenue, where a complete line of hardware and paints will be added to its line.

"And a goodly crowd was there"—"there" meaning Oakland, Calif., and the "crowd" the members

Officers of Denver Association Named Recently

D. N. Shannon was elected president of the Denver Electrical Contractors' Association at its recent annual meeting. Mr. Shannon succeeds T. Harry Byrne, president for the past year. Mr. Shannon was vice-president of the association during its past administration.

W. R. Kaffer was named vice-president and E. C. Headrick was re-elected secretary-treasurer.

Together with T. Harry Byrne and W. A. J. Guscott, the officers form a board of directors for the organization.

The Denver Electrical Contractors' Association has been an active organization for some time. It is affiliated with the Electragists International. A number of association activities tending to improve fraternal and business relations in the contractors' group during the next year are in process of organization.

Change Convention Date.—Announcement comes from the executive committee of the Northwest Association of Electrical Inspectors that the dates of the next convention have been changed to Jan. 26, 27 and 28, 1928. The convention will be held at the Olympic Hotel, Seattle, as formerly announced.

Motley Electric Service Company is the new firm name of the store purchased by **E. Motley** from **Cherman Electric Company** at 7809 Santa Monica Boulevard, Los Angeles. Mr. Motley was formerly associated with the **Dern Electric Company** of Hollywood and the **Franco Electric Company** of Sherman.

Chula Vista Electric Company has been opened recently by **Bill Garrick** at 288 Third Avenue, Chula Vista, Calif. Mr. Garrick is well known in the district and the new store is an attractive addition to the fast growing town.

A. Hughes, better known as "Pop," proprietor of the **National Electric Company,** San Francisco, recently moved to 730 Clementina Street.

West Well Represented on Program of Electragists' Convention

The West will be well represented at the twenty-seventh annual conventon of the Association of Electragists, International, to be held at the Hotel Chase, St. Louis, Aug. 8-12, for three of its best known electrical men will play a prominent part in the activities. First and foremost, of course, is Clyde L. Chamblin, president of the association, who hails from San Francisco where he is president of the California Electrical Construction Company. The other two are C. J. Geisbush, secretary, California Electragists, known throughout the state for his fine work in that association, and H. H. Courtright, manager, Valley Electrical Supply Company, Fresno, who has made a record in California for electrical merchandising. Plans are well under way for the convention, and the program as tentatively outlined follows:

Monday, Aug. 8.

Morning

Annual Electragists' golf tournament, Riverview Club, St. Louis.

Tuesday, Aug. 9.

Morning

9:00—Opening of Manufacturers' Exhibition, Palm Room, Hotel Chase.

Visits to St. Louis electrical establishments (manufacturing, jobbing, utilities, etc.), for delegates who register their choice in advance. Time will permit of visiting two plants; cars will leave Hotel Chase at 9 a.m., returning guests in time for luncheon.

Executive session, A.E.I. executive committee.

Afternoon

2:30: Small ballroom, Hotel Chase

Conference of accredited representatives of local and state associations of Electragists and electrical contractors and dealers.

Round-table discussion of problems of local and state secretaries, executive managers and association officers.

Evening

Municipal opera in the outdoor municipal theater in Forest Park (short walk from Hotel Chase)—Victor Herbert's "Serenade."

Wednesday, Aug. 10.

Morning

10:00: Convention Hall, Hotel Chase. Opening of twenty-seventh convention, A.E.I. General subject: "A United Industry." Addresses by Clyde L. Chamblin, president, Association of Electragists, International.

H. T. Sands, president, National Electric Light Association.

D. Hayes Murphy, vice-president, Supplies Division, National Electrical Manufacturers Association.

Albert L. Salt, president, Graybar Electric Company.

Afternoon

2:30: Convention Hall, Hotel Chase. General subject: "The Association at Work." Addresses by E. N. Peak, president, Iowa Association of Electragists. C. J. Geisbush, secretary, California Electragists.

John Kuhlemeyer, secretary, Illinois Chapter, Association of Electragists.

H. J. Biddle, manager, Detroit Branch, Association of Electragists.

Evening

The St. Louis Style Show at the open-air Garden Theater.

Thursday, Aug. 11.

Morning

10:00: Convention Hall, Hotel Chase. General subject: "Selling Our Service." Addresses by W. W. Freeman, president, Society for Electrical Development.

Earl Whiteborne, chairman, Industry Conference on Wiring.

H. H. Courtright, manager, Valley Electrical Supply Company, Fresno, Calif.

Afternoon

2:30: Convention Hall, Hotel Chase. Open forum: The Quantity Survey Bureau and Central Estimating. Registration and Licensing Legislation. The Electragist Standards for Wiring Installations. Standard Filing for Electrical Contractors.

(Discussion of these subjects to be led by men who have been working with the problems.)

Evening

7:30: Annual banquet.

Harmony Cup contest.

Orchestra and entertainment features.

Friday, Aug. 12.

Morning

10:00: Convention Hall, Hotel Chase. Presentation of past president's emblem.

Award of 1927 James H. McGraw Contractor-Dealer Medal.

Reports of special committees.

New business—suggestions from members.

Resolutions.

Adjournment.

Ladies' Program

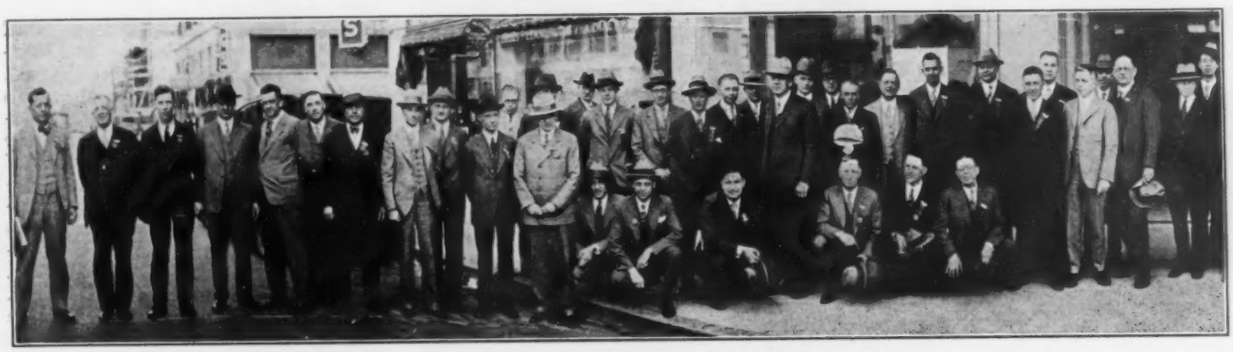
Monday—Golf and swimming at Riverview Club—all day.

Tuesday—Afternoon drive as guests of the hostess committee. Autos will call for the ladies at their hotels at 2:30 p.m.

Wednesday—Luncheon and bridge party at the Riverview Club, as guests of the St. Louis commitete. Autos will call for ladies at their hotels at 11 a.m.

Thursday—Matinee theater party as guests of hostess committee. Autos will call for ladies at their hotels at 2 p.m. and return them to their hotels about 5 p.m.

Also Municipal opera on Tuesday night; St. Louis style pageant at open-air Garden Theater on Wednesday night; annual Electragists' banquet on Thursday night.



of the California Association of Electrical Inspectors who recently held a meeting at that point.

Meetings

Utah Electrical Industry Holds Sixth Annual Meeting

The sixth annual convention of representatives of the various branches of the electrical industry in Salt Lake City and adjacent territory was held recently at the Newhouse Hotel in Salt Lake City. This gathering was sponsored by the Electrical League of Utah and was attended by a large number of electrical people.

The afternoon session was featured by interesting and instructive talks by local members of the industry and by city officials of Salt Lake City. R. M. Bleak, vice-president of the league, and superintendent of lighting and appliance sales for the Utah Power & Light Company, presided. B. E. Rowley, manager of the Salt Lake City branch of the Edison Electric Appliance Company, and president of the league, welcomed the guests. R. E. Folland, the league's new field secretary, followed with a short talk, outlining briefly some of the future plans of the organization, and urging a greater interest in its activities on the part of electrical men. Fred D. Winegar, city electrical inspector of Salt Lake City, discussed wiring conditions in the city. He called attention to the fact that conditions steadily are improving along this line, and stated that people are more prompt in taking care of improper wiring now than they ever have been before. Mr. Winegar recommended adherence to the standard code rather than the adoption of too many local modifications and changes.

W. H. Folland, city attorney of Salt Lake City, discussed the subject of "Law and Ordinance." He touched on a number of interesting points concerning the present ordinance covering electrical work in the city and the matter of licensing electrical contractors. He stated that the city officials are anxious to co-operate with the electrical interests in raising the standards of electrical installations in the city, keeping in mind the interests of all concerned, including the public generally.

A discussion of the league and its benefits, from the viewpoint of each branch of its membership, followed. Ernest Greer, of the Mountain States Telephone & Telegraph Company, outlined the telephone company's position. S. H. Babcock, Jr., of the Salt Lake City office of the Westinghouse company, gave the manufacturer's viewpoint; J. A. Kahn, president of the Capital Electric Company, the jobber's; George P. Trayner, of the Utah Power & Light Company, the central station's; and F. C. Wolters, manager of the Modern Electric Company, the contractor-dealer's.

At 6:30 p.m. a banquet was held in the ballroom of the Newhouse Hotel, at which B. E. Rowley presided, and P. M. Parry, commercial manager of the Utah Power & Light Company, acted as toastmaster.

J. M. Perlewitz, Salt Lake City manager for the Graybar Electric Company, was general chairman of convention arrangements.

Coming Events

American Institute of Electrical Engineers.—Pacific Coast convention at Hotel Del Monte, Del Monte, Calif., Sept. 13-16.

Association of Electragists, International.—Annual convention at Hotel Chase, St. Louis, Mo., Aug. 8.

Rocky Mountain Division, N.E.L.A.—Colorado Public Service Association.—Joint annual convention at Colorado Springs, Colo., Oct. 17-20.

Third Annual Golf Tournament of Seattle Electric Club

R. E. Thatcher, of the Puget Sound Power & Light Company, won the Harry J. Martin Cup at the third annual golf tournament of the Seattle Electric Club held recently at the Olympic Golf and Country Club. The play was preceded by the regular club luncheon at the clubhouse.

Competition for the cup was on the basis of medal play with full handicap allowance. In this event L. S. Ruble, of the North Coast Electric Company, was second and was awarded a Universal percolator, while C. O. Schmutz, of the Graybar Electric Company, who was third, received twelve golf balls.

In addition to the Harry J. Martin Cup, the following prizes were contributed: Universal urn-type percolator, Fobes Supply Company; vacuum cleaner, Pacific States Electric Company; waffle iron, Edison Electric Appliance Company; Automatic toaster, City Lighting Department; Westinghouse toaster, Schwabacher Hardware Company; carton of flame tint lamps, Puget Sound Power & Light Company; golf balls, Graybar Electric Company, Edison Lamp Works and Globe Electric Company. Cash for the purchase of golf merchandise, Westinghouse Electric & Manufacturing Company, and the General Electric Company.

Arrangements for the tournament were handled by a committee of which R. E. Thatcher was chairman and Harry J. Martin, of the National Carbon Company, vice-chairman.

J. J. Agutter (left) of J. J. Agutter & Company, electrical contractors, relinquishing the cup he held for one year to Harry J. Martin (right), the donor. Harry later turned the cup over to R. T. ("Reno") Thatcher, this year's winner, shown in action in the inset.

New Officers for Illuminating Engineering Society

An entertainment and dance was given June 10 at the Pacific Gas and Electric Company's auditorium in Oakland, Calif., in compliment to the outgoing officers of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society and to their recently elected successors.

The new officers are: president—C. D. Monteith, of the Pacific Gas and Electric Company, who succeeds Clark Baker, Sr., of the National Lamp Works; vice-president—James Mundstock of the I. P. Frink Company, Inc.; secretary-treasurer—F. A. Lavigne of the Westinghouse Electric & Manufacturing Company. The board of managers consists of Clark Baker, Sr., Miles F. Steel of the Benjamin Electric Manufacturing Company; J. R. Cravath, consulting illuminating engineer; H. H. Robinson of the Pacific Gas and Electric Company; and Leonard Hobbs, of the Edwin F. Guth Company.

A Team to Be Proud Of

The bowling team of the Los Angeles Electric Club that represented that organization in the Pacific Coast Bowling Congress which recently was held in Oakland, Calif, was composed of (left to right) M. A. Burch, of the Los Angeles Department of Water and Power team; J. J. Emerson, of the Southern California Telephone Company's team; J. A. Sines, Chicago Fuse Manufacturing Company, who bowls with manufacturers' agents' team No. 2; R. D. McCubbins, of the Pacific Electric Railway Company's team; and C. H. Groshong, of the Southern California Telephone Company's team. These men won their right to represent the club in the Pacific Coast tournament by finishing the season with high individual averages, which were, respectively, 185, 188, 192, 187 and 189. Mr. Sines, who is organizer and president of the Electric Club Bowling League, is chairman of the sports committee of the club.

Arizona Utilities Association Meets in Flagstaff

A joint meeting of the Arizona Utilities Association and the Pacific Coast Gas Association was held in Flagstaff, Ariz., May 26-27. An interesting program planned by the program committee, of which C. H. Webber, of The Tucson Gas, Electric Light & Power Company, was chairman, included, among the features of the first day's session a paper entitled, "Should the Utility Have an Active Merchandising Policy?", by A. F. Morairty, commercial manager, Central Arizona Light & Power Company, Phoenix, and one by Bruce Hannah, manager, Russell Electric and Machine Company, Tucson, on "Should the Utility Refrain from Selling Merchandise?"

During the morning session of the following day "Pentrex Treatment of Poles" was discussed by R. H. Felt, of the Chapin Pole Company, followed by a discussion of pole line construction, and in the afternoon Dwight B. Heard, director of the Arizona Colorado River Development Association, spoke on "Colorado River Development."

Entertainment included sightseeing trips and in the evening of the second day a banquet and dance.

L. M. Klauber, general superintendent, San Diego Consolidated Gas & Electric Company, San Diego, Calif., and S. H. Taylor, secretary, Pacific Coast Electrical Association, San Francisco, attended the meeting as representatives of the Pacific Coast organization.

Books & Bulletins

THE STATIONARY SPRAY PLANT

By Harry L. Garver, investigator, Washington Committee on the Relation of Electricity to Agriculture. General Bulletin No. 212, published by the State College of Washington Agricultural Experiment Station, Pullman, Wash.

This bulletin presents a study of the stationary spray plant for orchard spraying conducted by the Washington Committee on the Relation of Electricity to Agriculture in co-operation with the Division of Agricultural Engineering of the Washington State College. The study was made primarily in the Wenatchee apple district where the method was used first in 1910 and where now a greater development of the method is found than in any other fruit district of the state.

After a brief history of the development of the stationary spray plant, the bulletin describes methods of construction and installation of the different elements of the plant; the tank, the pump, the power and the housing. In the section under "Power" the statement is made, "Electric motors without question deliver the smoothest power and are probably more economical in the long run than any other kind of power."

A considerable portion of the bulletin then is devoted to a discussion of pressure requirements, showing the design of the relief valve used to regulate this pressure and keep it constant. The effect of different pressures and different sizes and types of nozzles on atomizing the spray, on its saturating qualities, on the discharged volume of spray material, on the height the spray is carried, and on its efficacy in controlling pests, is treated at length, giving in tabulated form the results of numerous experiments and tests.

Another section of the bulletin is given over to a discussion of piping the orchard, describing the return system and the dead-end system. Methods of installation by burying the pipes, by laying them on the ground, and by supporting them overhead are compared and contrasted as to the advantages of each method. The location of the plant, spacing of faucets, installation costs and operation costs are the subjects next discussed in order. Under the latter heading are given comparative figures on the cost of electric motor drive and gasoline engine drive, and conclusions favorable to the use of the electric motor are reached.

This bulletin should be extremely valuable to the farmer who is considering adopting this method of spraying his orchard, and to the central station company desiring to develop a volume of this class of load in the orchard districts it serves.

ELECTRIC POWER STATIONS

By L. W. W. Morrow, M.E.; Fellow, A.I.E.E.; Member, A.S.M.E. First edition, 1927; 326 pages; 38 tables; 177 illustrations; 6 x 9 in.; cloth bound. Published by McGraw-Hill Book Company, Inc. Price $4.

The field covered by this book is limited to steam-electric stations and the equipment utilized in such plants. A fundamental general knowledge of the different types of power plants, transmission and distribution equipment as regards its operating and construction details is presupposed. The text is devoted not so much to the equipment itself as to its most logical economical use in the production of electric power. The author is well qualified to write upon the subject of his book and is strategically situated for intimate study of the most modern electric generating stations now in operation. Thus the text represents his interpretation of the best engineering, economic and operating practice as followed out by different utility companies and utility engineers.

The first three chapters are given over to a consideration of the present position of electric power in the scheme of national affairs and future possibities; to a review of definitions and terms in the light of modern standardization; and to a study of the general conditions which determine the location of a generating station. The next six chapters are devoted to the application and operation of all the machinery and equipment in the steam and mechanical portion of the power plant. The electrical layout and arrangement of electrical control is dealt with in the concluding chapters.

Personals

George Clinton Ward, vice-president in charge of engineering and construction for the Southern California Edison Company, has had conferred upon him the honorary degree of Doctor of Engineering by the University of Southern California for his outstanding work in that field. This is one of the rarest of all honorary degrees. Out of 700 honorary degrees granted last year by all the universities and colleges of the country, only seven men received the degree of Doctor of Engineering.

Mr. Ward started his career by "workin' on the railroad," as the old song has it. Leaving Phillips Andover Academy in 1882, Mr. Ward stepped immediately into railroad location and survey for the Raquet Lake Railroad in the State of New York. Until 1906 he was connected continuously with railroad and bridge building. During those years he became associated with Collis P. Huntington and later with Henry E. Huntington. It was at the instigation of the latter that Mr. Ward moved to

GEORGE CLINTON WARD

California and entered into the work of developing the great hydroelectric potentialities in the southern part of the state.

Since 1912 when the Big Creek-San Joaquin River project of the Southern California Edison Company first was conceived he has been actively interested in the work, and his guiding hand has been apparent throughout. His outstanding achievement in connection with this enormous task was the successful carrying through to completion, in record-breaking time, of the thirteen-mile Florence Lake tunnel through the solid granite of the high Sierra. In recognition of this achievement he was presented with a bronze medallion by the United States Chamber of Commerce in December, 1925.

Franklin T. Griffith, president, Portland Electric Power Company, Portland, after a long illness during which he was absent most of the time from the executive office, recently returned to his desk in excellent health.

R. U. Muffley, formerly manager of the eastern district, Puget Sound Power & Light Company, Wenatchee, Wash., recently has been appointed to the po-

R. U. MUFFLEY

sition of sales manager of the central district for the company at Seattle, taking the place of **R. W. Clark,** who has been promoted to be merchandise sales manager for the entire territory served by the company.

Mr. Muffley was born in Fairmont, Minn., in 1883, and after going through the schools of that city and taking a commercial course at Toland's University, LaCrosse, Wis., he entered the employ of the Fairmont Electric Company in 1901. In 1903 he came West to engage in the wiring and contracting business, first in Seattle and later in Whatcom, now Bellingham, Wash. In 1905 he joined the Whatcom County Railway & Light Company first as wireman, shortly becoming assistant superintendent of distribution, then, in 1908, superintendent of distribution and, in 1914, superintendent of light and power, a position he held for over eight years. Meanwhile the Whatcom County company had passed to the control of the Puget Sound Power & Light Company. In January, 1923, when the Puget Sound company acquired the properties of the Washington Coast Utilities Company centering around Wenatchee, Wash., Mr. Muffley was made manager of those properties with headquarters in Seattle, removing to Wenatchee in August, 1924, as manager of the eastern district of the Puget Sound company. Promotion to his present position was effective May 1, 1927.

J. F. Pollard, vice-president and general manager, Coast Valleys Gas & Electric Company, Salinas, Calif., has been elected president of the local Rotary Club.

Martin M. Johnson, former representative for Hubbard & Company, Salt Lake City, has resigned to become associated with the Kelvinator Corporation of Detroit, Mich.

Dr. Harris J. Ryan, professor of electrical engineering at Stanford University, Palo Alto, Calif., has been elected by unanimous vote an honorary member of the Engineers' Club of San Francisco.

Ed Power, formerly with the Sandoval Sales Company and prior to that connected with the Pacific Gas and Electric Company, San Francisco, has joined the Truckee River Power Company, with headquarters in that city.

Walter H. Burke, since July, 1925, manager, Northern Texas Traction Company, Fort Worth, has been made district manager of the Southwestern Division, Stone & Webster, Inc., with headquarters in El Paso, succeeding **George H. Clifford,** recently appointed division manager in charge of the Southwestern District and the Virginia properties.

Dr. K. Nakamura, president of the Tokyo Higher Technical School and for a number of years head of its department of electrical engineering, recently was elected president of the Japanese Institute of Electrical Engineers.

T. G. Bradley, general superintendent for The California Oregon Power Company, Medford, Ore., is one of the best known and best loved employees of the Copco organization. In length of continuous service, he is its second oldest member for he has been connected with the company for twenty-four years.

Born in 1871, Mr. Bradley left home at the age of 18 and was successively gold miner on the Klamath River, stock tender for the stage line from Ager to Lakeview at Linkville (now Klamath Falls), cow-puncher in eastern Oregon, fireman on the Northern Pacific Railroad in Idaho and steam engineer for mines and sawmills in California and Oregon. From 1896 to 1902 he worked for Jerome Churchill running the pump which supplied the town of Yreka, Calif., with water.

His first experience with public utilities was with the Siskiyou Electric Light & Power Company, now a part of The California Oregon system, doing pick-and-shovel work when the development at Fall Creek was started. In the fall of 1904 he was married and went to Fall Creek as operator. From that time on his career followed the growth

T. G. BRADLEY

of The California Oregon company culminating in his appointment as general superintendent, a position to which he recently was promoted from that of superintendent of power houses.

H. W. Young, president, Delta-Star Electric Company, Chicago, is vice-chairman of the committee of organization of the United States delegation which will attend the fourth session of the International Electrical High-Voltage Conference to be held in Paris, June 23-July 2, 1927.

H. E. Sherman, vice-president and sales manager, Illinois Electric Company of Los Angeles, has severed his connection with that company to become associated with the Leo J. Meyberg Company as general manager of its Los Angeles office. Mr. Sherman has been with the Illinois Electric Company for seven years. **George A. Vetter**, who has been assistant sales manager under Mr. Sherman, is to succeed him as sales manager. **Elmer Read**, who has been a radio equipment salesman for the Illinois Electric Company, also has resigned his position to join the Meyberg company in a sales capacity. He will be succeeded by **Fred Scrafield** of the sales force of the Sherman-Clay Company.

W. C. Sterne, president and general manager, Summit County Power Company, Denver, has been re-elected head of the electrical bureau of the Chamber of Commerce of that city.

H. C. Rice, who has been acting head of the merchandising department of the Southern California Edison Company since **R. I. Carruthers**, the former manager, was injured in an automobile accident last July, has been made manager of the department. Since leaving school in 1911 Mr. Rice has been affiliated constantly with the electrical industry, with the exception of two years spent with the A.E.F. in France. For six years he worked with the Beacon Light Company of Los Angeles in the wiring division. In 1916 he joined the Great Western Power Company in the range installation department, leaving that company to begin work as a range salesman for the Southern California Edison Company in the Monrovia district in 1917. Upon his return from army

H. C. RICE

service he was transferred to the general offices in Los Angeles and made chief appliance salesman, and in 1925 was promoted to the position of assistant manager of merchandising.

William D. Ward, general sales manager for the William Cramp & Sons Ship & Engine Building Company and subsidiaries, with offices in New York

WILLIAM D. WARD

and Philadelphia, has been appointed vice-president of the Cramp Engine Building Company, Cramp Brass & Iron Foundries Company, Cramp-Morris Industrials, Inc., and the Federal Steel Company of Philadelphia and New York. Mr. Ward's early schooling and technical training were obtained in San Francisco. In 1898 he became associated with the Pelton Water Wheel Company in that city and advanced steadily in that organization. In 1919 he became manager of the company's New York office, a position which he still retains. With the consolidation of the Pelton Water Wheel Company and the William Cramp & Sons Ship & Engine Building Company he assumed also the general sales management of the latter organization. Recently Mr. Ward was appointed assistant to H. Birchard Taylor, president of the Cramp-Morris Industrials, Inc., and from that capacity he was promoted to his present positions.

Frederick H. Fowler, consulting civil engineer of San Francisco, recently spoke on "The Boulder Dam Project" before a meeting of the Business and Professional Women's Club of San Francisco, Inc.

R. H. Ballard, vice-president and general manager, Southern California Edison Company, Los Angeles, has been made vice-president and chairman of the executive board of the American Green Cross, an organization formed for the preservation of forests.

Obituary

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, died in New York June 14, at the age of 62. At the time of his death he was also a director in many other companies.

Mr. Tripp was educated at South Berwick Academy in Maine, and at the age of eighteen entered the employ of the Eastern Railway Company as a clerk, remaining in that service seven years. In 1890 he became storekeeper for the Thomas-Houston Electric Company and shortly afterward was made traveling auditor for that company. In 1897 he became associated with Stone & Webster, occupying successively important positions until he was elected vice-president of the Stone & Webster Management Association and also of the Stone & Webster Engineering Corporation. In 1910 he acted as the special representative of Stone & Webster in the matter of the receivership of the Metropolitan Street Railway Company of New York and later was selected as chairman of the joint committee on reorganization. Upon the completion of that work he assumed on Feb. 10, 1912, the duties of the position with the Westinghouse company that he held at the time of his death. During the World War Mr. Tripp was appointed chief of the production division of the Ordnance Department of the Army with the rank of major, and ten months later was made a brigadier general and assistant to the chief of ordnance. Upon leaving the service he was awarded the Distinguished Service Medal.

GUY E. TRIPP

Through his keen interest in the future of electrical development in America he had made an exhaustive study of the American power situation, and the more important of his articles and addresses on this subject have been published under the title, "Superpower as an Aid to Progress." He was a member of many civic and scientific organizations.

Robert Garfield Wagner, president, Wagner-Woodruff Fixture Company of Los Angeles, died May 7 after an illness of a few weeks. Mr. Wagner had been a resident of Los Angeles for more than thirty years, and was one of the original members of the electrical industry in southern California.

Mrs. Curtis B. Hawley, wife of the president of the Inter-Mountain Electric Company, Salt Lake City, died June 2 from injuries received in an automobile accident near Elko, Nev., as she and her husband were returning from the convention of the Pacific Coast jobbers at Del Monte, Calif.

Manufacturer & Distributor

The Tubular Woven Fabric Company, Pawtucket, R. I., has announced the appointment of **C. Dent Slaughter** as Pacific Coast representative for Durabilt products, with headquarters at 314 Twelfth Street, San Francisco. Stocks will be carried at all Coast jobbing centers. **Frank P. VonAh,** formerly manager of the Oakland office of Allied Industries, Inc., will be associated with Mr. Slaughter in the northern California territory, and **Walter J. ("Sully") Sullivan,** for the past six years associated with the Los Angeles branch of Allied Industries, will join Mr. Slaughter's staff in charge of the Los Angeles office and warehouse at 324 North San Pedro Street, Room 538.

The National Refrigerating Company, the refrigeration division of the Winchester Repeating Arms Company, New Haven, Conn., has opened offices, warehouse and service station at 1129 Folsom Street, San Francisco. **J. C. Douglas** is Pacific Coast representative.

The Crescent Shops, manufacturers of electrical, machine and sheet metal products, formerly established at 1016 Crescent Heights Boulevard, Los Angeles, have removed to their new plant at 1116 East 16th Street, in that city.

Baitinger Electric Company, Inc., formerly of 100 Chambers Street, New York, has removed to larger quarters at 95 Chambers Street, in that city.

The Harrison Sales Company, Seattle branch, has removed to 309 Lenora Street in that city.

The Automatic Appliance Company, with headquarters at 2080 Broadway, Oakland, Calif., a newly organized concern whose slogan is "Chain store merchandisers of quality electrical appliances—no interest—no carrying charges," has opened stores in San Francisco at 1182 Market Street, Stockton, Sacramento, Palo Alto, San Rafael, San Jose, San Mateo, Burlingame, Oroville, Gilroy, Santa Cruz and Monterey under the names of Happy Home Shops. The company plans to carry refrigerators, radios, washers, ironers, cleaners and a limited stock of small appliances and expects to operate in northern California, Arizona and Nevada. **L. B. Osborn,** for a number of years connected with the Thor Electric Shops in the Bay region, is sales manager.

The Illinois Electric Company, 313 South San Pedro Street, Los Angeles, recently has been appointed distributor of the popcorn popper manufactured by the **Excel Electric Company,** Muncie, Ind., and also of the Toastmaster manufactured by the **Waters Genter Company,** Minneapolis, Minn.

The Brown Instrument Company, Philadelphia, has opened a branch office in Cincinnati, Ohio, at 718 First National Bank Building. **J. R. Green** is district manager.

Emerson Electric Manufacturing Company, with offices formerly in the Transportation Building, Chicago, has removed to 806 West Washington Boulevard, Room 5, that city.

When Three's Company

Left to right—William Goodrich, sales manager, Goodrich Electric Company, Chicago; H. M. Pomeroy, president, J. G. Pomeroy Company, Los Angeles; and William Tardif, manager of the latter company's San Francisco branch, in front of the establishment at 960 Folsom Street in that city. Mr. Tardif formerly was connected with Alexander & Lavenson Electrical Supply Company.

Farnham & Cunningham, 307 South Hill Street, Los Angeles, have been appointed southern California representatives for the **Western Electro-Mechanical Company, Inc.,** Oakland, Calif., which manufactures automatic reclosing equipment. This equipment originally was developed by **C. E. Schnell** and **E. K. Sadler** of the **San Joaquin Light & Power Corporation,** Fresno. Other devices manufactured by the company include Knopp multirange a.c. ammeters and a.c. line current test sets, which were developed originally by **Otto A. Knopp** of the **Pacific Gas and Electric Company,** San Francisco.

The Pyle-National Company, Chicago, has established a new floodlight engineering service, which to quote the announcement, "offers to effect the entire design of a floodlight system, together with complete specifications and bill of material on which actual quotations of material and installation costs will be made. All that is necessary is to supply the company's engineers with a plan of the area to be lighted and an indication of the possible locations for towers. From this plan the company will design a correct layout and supply all or any part of the necessary equipment and will, when desired, furnish expert installation supervision."

The Detroit Section of the **Society of Refrigeration Engineers** recently was formed in that city, and the following officers were elected: president—**Chas. C. Spreen,** chief engineer of the Kelvinator Corporation; first vice-president—**Lester J. Keilholtz,** chief engineer Frigidaire Corporation; second vice-president—**W. D. McElhinny,** vice-president in charge of sales Copeland Products; secretary—**D. G. Ellis,** Kelvinator Corporation; treasurer—**A. D. McLay,** Detroit Edison Company.

Harold E. Trent Company, 439-43 North Twelfth Street, Philadelphia, has removed to larger premises at the address given. It is the intention of this company to develop large-size metal pots and pot furnaces up to 1,700 deg. F., in addition to its standard line of metal melting pots up to 1,500 lb. capacity and 1,000 deg. F., according to the company's announcement.

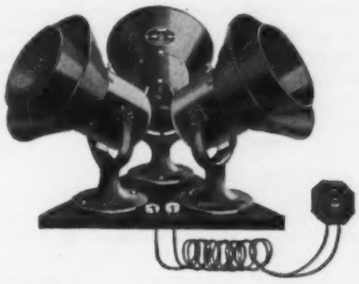
The Crouse-Hinds Company, Syracuse, N. Y., has announced a $1,300,000 group life insurance program, which includes the advantages of a visiting nurse service and the regular distribution of health conservation pamphlets. The program provides protection for more than 1,200 male and female employees.

H. O. Swoboda, Inc., consulting electrical and mechanical engineers, with offices formerly in the Empire Building, Pittsburgh, have removed to 3400 Forbes Street, in that city.

New Equipment

Siren

The "Triple-A" **Siren** for use as a fire alarm in villages, schools, industrial establishments, factories, mines, and warehouses is announced by the **Federal Electric Company,** 8700 South State Street, Chicago.



The Triple-A Siren is designed to serve also as a start-and-quit-work signal in factories, mines and the like. The three sirens of which it is made up are connected in parallel and operate from one push-button switch. Each siren has approximately one-third horsepower.

Handle Cap Plug

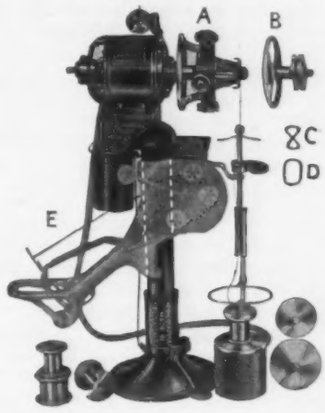
The **handle cap plug** shown in the illustration is manufactured by the **Beaver Machine & Tool Company, Inc.,** 625-643 North Third Street, Newark, N. J. According to the manufacturer, the new feature is the knob, which serves as a "handle," greatly facilitating the user's grasping the plug either to insert it or withdraw it from service outlets. It would appear to be particularly applicable for use on vacuum cleaners or other appliances that are connected and disconnected frequently. The company states that the ferrule is of steel, thus giving it all the advantages of an armored cap. It comes in black as a standard color although manufacturers or large users are offered color options. Retail price 25 cents.

The Lens Lamp Company of Newark, N. J., for which the **Continental Corporation,** 179 W. Washington Street, Chicago, is acting as sales division, recently placed on the market the **Lens Lamp,** a bulb which contains a built-in lens which magnifies and concentrates the light rays into an intense stream of great penetrating power, according to the company's announcement. It is claimed for this spot and headlight bulb that the strong stream of light that shoots onto the road is accompanied by less glare than is found in the light from any other auto bulb, and that at the same time concentration is increased greatly, the light cutting through fog with much better effect than autoists have been accustomed to.

Dereeler

The **P. E. Chapman Electrical Works,** northeast corner of Tenth and Walnut Streets, St. Louis, Mo., announces the new **Chapman Compensating Tensionless Dereeler** for use in connection with any winding machine (but pictured in connection with a Chapman armature winding machine) which it is claimed will dereel magnet wire under no tension, permitting of high-speed winding of armatures with enameled covered wire.

To wind phase or other coils a winding form B is substituted for the armature winding head "A" and phase coils will stay straight as shown by "D"



when removed therefrom, as the twisting of the thread covering is compensated for.

It is claimed that the broken-headed spool shown at the bottom of the picture was dereeled successfully by this device.

The tension device and reel holder "E" is not used on this class of work, as it delivers wire under high tension.

Walter D. Graham, manufacturer of **electric body-warming appliances,** 4421 West Carroll Avenue, Chicago, has announced the following additions to his line: the Graham electrically heated sleeping porch blanket recommended for use in outdoor sleeping; suit for aviators, electrically heated and connected to the battery of airplane when being used; a warming-pad known as the Graham warming belt which can be strapped on to the different parts of the body and will not work out of place; the Graham warming neck pad and electrically heated health blanket for hospital and home use. Copy of booklet describing these appliances may be had upon request.

Radio Set Tester

The Weston Electrical Instrument Corporation, Newark, N. J., manufacturer of electrical measuring instruments, has developed a **radio set tester,** Model 519, for the especial use of the radio service man and for use by dealers in shooting trouble. The company states that this testing set will measure

the various voltages used in a radio set both at the battery terminals and at the tube sockets. It may be used for testing continuity and condition of circuits, and for testing the tubes under the same condition as exists when they are in their sockets. It is claimed it will make all tests by using the regular batteries or battery eliminator used in the radio set, with no change in connections, so that no auxiliary batteries are required.

Rectox is the name of the new **trickle charger** being manufactured by the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh. The rectifying element consists of stacks of alternate disks, or rather washers, of copper with one side oxidized, and lead, which freely pass current in one direction only, forming a rectifying device. The copper washers, or disks, are oxidized on one side in furnaces under very high temperature and when separated from each other by a soft metal give the desired results. The application of this principle at the present time is in connection with the trickle charging of storage batteries, when the charging is continuous, or nearly so, to replace the power used.

The **Chicago Fuse Manufacturing Company** now is furnishing union outlet boxes for sheathed and metallic cable or loom with a **new type clamp,** which is tightened after the box is installed. The box is hung in the usual way, with or without bar hangers, the cable or loom brought through the knockouts, pulled up tight and the clamp screwed down.

The screw heads are on the inside of the box and with the clamps are placed diagonally. The angle is such that the screw heads are easily accessible to the screw driver in all boxes, including those with bushing plates. In boxes 1½ in. deep the diagonally placed clamp will fasten the loom or cable whether it enters from the knockouts in the bottom or those in the side.

Standardized Wire-Way

Curtistrip, manufactured by **Curtis Lighting, Inc.**, 1119 W. Jackson Boulevard, Chicago, is the name of a standardized wire-way which that company is placing on the market. In the words of the description furnished by the company, "Curtistrip is a wire-way constructed of 20-gage steel with a flat

cover of the same material. A heavy electroplating of Udylite on all metal parts prevents rust and corrosion. The cover is easily snapped into place in the spring-like groove provided in the channel. Both channel section and cover are supplied in standard lengths of 10 ft. The X-Raylets (the name given to the standardized fittings) include the minimum number of standardized fittings—receptacles, box adapters, adjustable elbows, brackets, nipple attachments, end caps and straps. Curtistrip can be easily cut to the desired length to fit any type of installation. Sections of cover not only act as a means of closing the wireway but serve as spacers for the receptacles."

The Ericson Manufacturing Company, Cleveland, announces the addition of a complete assembled **safety heater cord** to its line. Its outstanding feature is that the joint between the cord and the plug at each end is reinforced and protected by a C & E safety handle. This is the weakest part of any cord and a point where in the past a great deal of trouble has originated. The company claims that not only do C & E safety handles provide a remarkable factor of safety, but they also reinforce the connection and constitute a handle for pulling out the plug, thus relieving the small wires which compose the conductor from the strain of this service.

O. Zernickow Company, 15 Park Row, New York, recently has brought out a line of **O-Z stationary tachometers.** This company claims that these instruments "represent a radical improvement over other makes in that they are free running, dead-beat sensitive and accurate to within ½ of 1 per cent at any point of scale. The operating principle is similar to the centrifugal pendulum construction as embodied in the O-Z hand tachometer." Standard range is from 2 to 16 times the minimum speed either for r.p.m. or f.p.m. speeds.

Recent Publications

Track Circuit Handbook.—Under this title M. W. Manz, manager, railroad material sales, **Ohio Brass Company**, in collaboration with J. B. Weigel and W. P. Bovard, engineers of the same company, has prepared a treatise which discusses all phases of the relation of the bonded track circuit to proper operation of the automatic block signal system, in the words of the company's announcement. In addition, there is a study of the theories and facts of gas-weld bonding, instructions for circuit adjustments and tests, representative track circuit calculations, historical data on bonding, tables and data used in everyday signal department work. Price $1.

Electrical Measuring Instruments.—The Jewell Electrical Instrument Company, 1640-50 Walnut Street, Chicago, recently has issued the following pamphlets: "New Jewell A.C. Movement" descriptive of the movement of the Jewell Pattern No. 30 instruments, accompanied by a detailed construction bulletin; "A Story of Insulation" descriptive of the insulation used in Jewell instruments; and "27 Years Making Good Instruments," which deals with the history of the company, gives an interior and exterior view of its factory and lists its representatives.

Link-Belt Elevators and Conveyors.—"Handling Things—From Where They Are to Where You Want Them," Book 575 of the **Link-Belt Company**, 910 South Michigan Avenue, Chicago, covers many types of handling equipment applicable to a wide field of industrial conditions. The book is of convenient size and has numerous illustrations showing methods of elevating and conveying.

Electric Heating and Resistor Field.—The Acme Electric Heating Company, 1207-1223 Washington Street, Boston, Mass., has published a new catalog, series C, complete and revised and containing valuable information relative to the electric heating and resistor field.

Tubular Electric Furnace for Heat Treating.—A reprint in pamphlet form from March, 1927, Forging-Stamping-Heat Treating, Bulletin No. 96, is being distributed by **H. O. Swoboda, Inc.**, consulting electrical and mechanical engineer, Pittsburgh, Pa.

Airport and Airway Lighting.—A comprehensive discussion of the lighting of airports and airways recently has been issued in the form of Bulletin E-107 by the **Westinghouse Lamp Company**, New York.

Coolers and Strainers.—Bulletin No. 1026 on bronze tube air coolers, Bulletin No. 1030 on oil coolers, and Bulletin 125 on Type 101 Duplex strainers, recently have been issued by the **Andale Engineering Company**, 1015 Chestnut Street Philadelphia. **DeLaval Pacific Company**, 61 Beale Street, San Francisco, is the exclusive distributor for the company's products on the Pacific Coast and in the Orient.

Panelboards.—Catalog No. 40 illustrates, describes and lists the standardized panelboards of various types manufactured by the **Frank Adam Electric Company**, 3650 Windsor Place, St. Louis. This catalog embodies all price revisions based on the company's latest factory costs.

Refrigerator Models.—"New Copeland Models for the Home" and "An Amazing New Model" are two pamphlets recently issued by the **Copeland Sales Company**, Detroit, describing its new electric refrigerators for smaller homes and apartments.

Hotpoint Electric Ranges, Hot Plates and Water Heaters.—Catalog G6 published by the **Edison Electric Appliance Company, Inc.**, 5600 West Taylor Street, Chicago, gives detailed specifications of its different models of electric ranges and its Economy cooker, Hotpoint water heaters, air heaters and hotplates.

Rates and Load Building.—Under this title the **Sangamo Electric Company**, Springfield, Ill., has published "a brief account of the various electric service rate systems, supplemented by discussions of some of the important factors involved in scientific load building."

Ajax Electric Furnaces.—This is a recently issued bulletin on quantity steel production in the Ajax-Northrup high-frequency furnace, manufactured by the **Ajax Electrothermic Corporation**, Trenton, N. J.

Fynn Weichsel Motors.—Bulletin No. 144 issued by the **Wagner Electric Corporation**, St. Louis, sets forth the advantages and characteristics of these motors.

Outdoor Station Equipment.—This bulletin descriptive of type LG-207 disconnecting switches recently has been published by the **General Electric Company**, Schenectady, N. Y.

Console Electric Sewing Machines.—Graybar Electric Company is distributing a small folder describing its console cabinets and types of electric sewing machine heads for those cabinets.